

LONG ISLAND SINCLAIR TIMEX GROUP

L.I.S.T.ING

May June
1985

Issue Price \$1.50

MEETING NOTES - APRIL 14, 1985

The April meeting of LIST was held in Centerport at 2:00PM Sunday April 14, 1985.

The Sec'y Treasurer indicated that the treasury is sound and that total membership has trebled since April of 1984.

A Special User group offer from Computer Shopper was announced but, as many members already subscribe, only 2 attendees signed up (\$5 for 6 months).

Social Activities were proposed, but as no concrete proposals were aired, action was postponed. Paul C. and Harvey R. will be investigating suitable activities/trips etc. and will offer suggestions at the May meeting. A trip to Atlantic City and perhaps mini-convention with other East Coast groups was mentioned, but no action taken.

Some library materials and tapes have not been returned. Members are urged to bring back any overdue materials. (In many cases these items were personal copies "lent" to the library in the first place).

A Bulletin Board for LIST, either our own or in Special Interest Group on another's (e.g., Zebra, Compuserve) was discussed. A potential Sysop could not be found. S. Newfield volunteered to donate a Quazone dumb terminal to the Library for use by those considering a modem or just curious about telecommunications.

A Hardware workshop, where the group buys hardware or kits (later reimbursed by members), and these items are then assembled, under supervision, was proposed. This proposal received enthusiastic support. Suggestions included Kempston joysticks, RGB adaptor and Spectrum Emulations. Members are encouraged to contact Paul D. or Nazir P. with their suggestions. If we can get about 5-10 people interested in building one item (e.g., Interface Zero, RGB) a special hardware workshop will be convened, as soon as supplies can be purchased.

NEXT MEETINGS:

May 5, 1985 - at Herbert W's in Seaford - 2:00PM - See map in Members only section.

June 9, 1985 - Kennedy Airport - See Bob G's - map.

July 28, 1985 - Tentative

Agenda - Formal "talks" were proposed for all future meetings. If you feel you can 'hold forth' on a hardware or software subject, of your choice, for the group, please contact Jeff S.

News Notes:

QL - The QL is still waiting FCC approval.

TC 2068 - Timex Portugal is producing the TC 2068 and Disc. Drives.

Visit UK - Stewart N. of Zebra Systems and John W. of Sunset will be making a joint visit to the U.K. They will be making contact with U.K. suppliers.

Bank Switching - Nazir has developed a "twistor" which will allow the use of many ZX81/TS1000 peripherals on the 2068. 16K RAM PACKS FOR BANK Switching RAM were the first tested.

International - Joe Z. from Warsaw (Poland) and Tim Lowe from London attended the April meeting.

Membership - 6 new members signed up after the meeting.

DEMOS:

NAZIR Demoed his TC2068 with disc drive. These units are produced by Timex Portugal (not Timex, per se) and are available in the U.K. Several others are also known to have turned up here lately.

The TC 2068 (using RGB) comes up with 3 copyright notices (Sinclair, Timex and Timex Portugal). Nazir hasn't doped out all the extra pins yet, but it appears to have a Spectrum compatible buss. The Timex ROM seems to be used.

The Disk Drives are 3" (à la MacIntosh) and easy to use.

The TC2068 is also known as the "Silver Avenger" and sells for about \$159.00. The Disk Drives (including all necessary hardware) will probably retail for \$239.

Paul D. demoed his microdrive and loaded a number of games (e.g., Manic Miner, Ghostbusters) which were enjoyed by younger - older members alike.

Paul also fired up his old RIST Parrot. His was an original model using the GI SPO 256 chip. He had successfully uploaded RIST's BASIC Software from the 1000 and needed to add only a few (10) lines of code to convert the software for the 2068. Since the Parrot is I/O mapped, it is buss compatible (i.e., will run on both the 2068 and 1000).

Jeff S. had some loading problems with his Zebra talker tape, so we didn't get a good "side by side" comparison, we'll try again.

Paul C's QL was hooked up to Bob G's Hantarex Monitor. right at the meeting. Synch problems couldn't be ironed out with the hardware on hand.

LIST GROUP

P.O. BOX 438

CENTERPORT, N.Y. 11721-0438

ITEM	PAGE
Meeting Notes	1
Index/Classifieds	2
Graphics	3
Line Draw - P. Fagan	4
Business Graphics - J. Gaddis	
Software Reviews	5
FP Compiler - W. Brzozowski	6
Pro-File Plus - S. Kaye	
Communications	7
On Line Notes - Sincus	
ZX Forum	
Bulletin Boards - Computer Shopper	
Supplier Notes	8
Letters	9
Tape Worry M's	12
Bob Gilder	
F. Nachbaur	
J. Bell (TSH)	
Printout	13
Printer Tip - S. Kaye	
Repeat Tasword - Bob Gilder	
Hardware Computability Chart	14
- P. Donnelly	
Interface Zero Plans	15
W. Brzozowski	
J. Olliger	
Hardware Projects - RGB	16
1) Interfacing the QL - Sinclair	18
2) TS 2068/Sears/IBM - Hackers Journal	
Using the Hunter NVRAM	19
P. Donnelly	
Screen \$ TS1000	20
C. Barwt	
Comments	21
Surplus ZX81's - J. Peeler	
Microdrive Stretch - Staff	
Follow up - Miscellaneous, Policy	22
Special Feature	
TC 2068 - N. Pashtoon	
Bank Switching - 2068/TS1000- N. Pashtoon	

Articles represent the opinion of the author and not necessarily the LIST Group. LIST disclaims any responsibility for anything you may do to your computer as a result of reading any article in LIST.ing.

Classified Ads

TS-2068

Want to sell TS-2068 which includes: Romswitch + AERCO printer interface + Sam's book (Beginner + Advanced guide) + original softwares: MCSRIPT, FLIGHT SIMULATOR, PROFILE, DEATHCHASE, VOICE CHESS & TIME GATE + other copies.
Best offer. Call: 516 293-5284 ask for Garin/ Atiq.

T/S 1000 16 OR 64K
T-FILE HOMEFILE MANAGER, ALL
ASSEMBLY LANGUAGE FOR FAST ENTRY
AND ACCESS OF FILES. ONLY \$10.00
T-WARE:
40 ASPEN, GREAT FALLS MT 59405

DOT MATRIX PRINTERS- 29.95+U.P.S.
shipping

Brand new Mindware Printers for the T/S 1000 and ZX 81 with paper, instructions power supply and guarantee card. These printers offer a 16 column format and use ribbons that are readily available from Radio Shack stores.

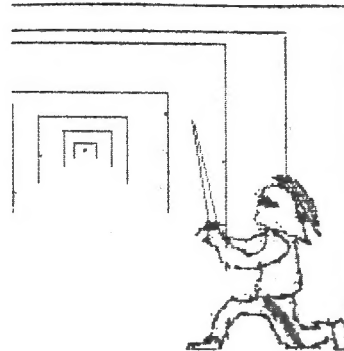
For information contact Steven Kaye
c/o L.I.S.T.- P.O. Box 438, Centerport,
N.Y. 11721-0438

Please allow 4 weeks for response or delivery.

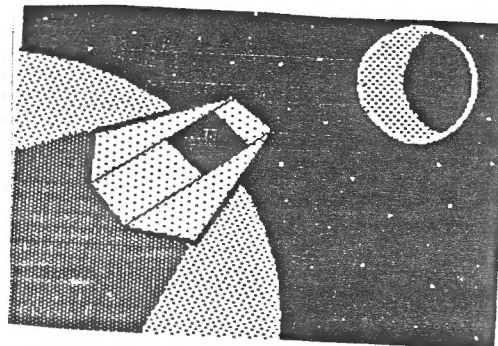
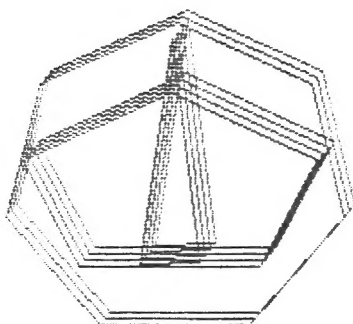
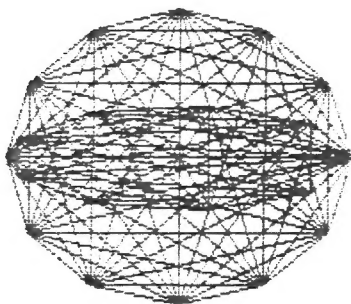
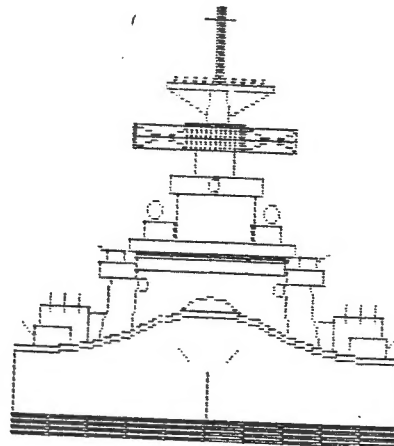
```

1000 REM DRAW LINES FROM POINT
1010 ON CIRCUMFERENCE TO OTHER POINTS
1020 ON CIRCUMFERENCE
1030 LET C=0
1040 DIM X(20): DIM Y(20)
1050 LET C=C+1
1060 LET N=INT (RND*6)+8
1070 LET P=2*PI/N
1080 INPUT "DISTANCE X":DISTANCE
1090 Y FROM CENTER CO-ORD":E:" "F
1100 FOR I=1 TO N
1110 LET Z=P*I
1120 LET X(I)=INT (COS Z+E+127)
1130 LET Y(I)=INT (SIN Z+F+85)
1140 NEXT I
1150 FOR I=1 TO N
1160 PLOT X(I),Y(I)
1170 NEXT I
1180 INK 9
1190 FOR W=N TO 1 STEP -1
1200 FOR I=1 TO n
1210 PLOT X(W),Y(W)
1220 DRAW INT X(I)-X(W),INT Y(I)-
1230 Y(W)
1240 NEXT I: NEXT W
1250 IF C=5 THEN STOP STOP
1260 GO TO 1040
1270 REM DRAW MULTIPLE SIERPINSKI FIGURE
1280 LET A=0
1290 DIM X(30): DIM Y(30)
1300 INPUT "# OF POLYGON SIDES "
1310 INPUT "# OF POLYGONS?" :SI
1320 LET P=2*PI: LET q=0: LET S
1330 LET q=q+1: LET r=87
1340 INPUT "DISTANCE X":DISTANCE
1350 Y FROM CENTER CO-ORD":E:" "F
1360 INPUT "AMOUNT OF ROTATION?"
1370 FOR t=0 TO SI-1
1380 LET q=q+1
1390 FOR n=1 TO sd
1400 LET Z=sp+n+q
1410 LET X(n)=INT (SIN Z+E+q)
1420 LET Y(n)=INT (COS Z+F+r)
1430 NEXT n
1440 LET n=sd-1
1450 FOR s=sd TO 1 STEP -1
1460 PLOT X(n),Y(n): DRAW X(s)-X
1470 (n),Y(s)-Y(n)
1480 LET n=n-1
1490 IF n=0 THEN LET n=sd
1500 NEXT s: LET q=q-3: LET r=r-
1510 NEXT t: LET A=A+1
1520 IF A=3 THEN STOP
1530 GO TO 1040

```



Screen from GUARDIAN:



SHO
G

```

5 DIM i(12): DIM t(3): DIM r(12)
6 LET n=0: LET x=0: LET l=0: LET e=0: LET i=0
10 BORDER 0: PAPER 0: INK 7
11 CLS
20 PRINT AT 11,2;"Do you want new data (Y/N)"
30 IF INKEY$="y" THEN GO TO 50
40 IF INKEY$="n" THEN GO TO 3000
44 GO TO 30
50 CLS
55 PRINT AT 11,0;"How many numbers for graph?"
60 INPUT t
65 IF t>12 THEN GO TO 200
100 CLS
110 FOR x=n+1 TO t
120 LET l=x
142 PRINT AT 0,10;"Enter Data"
145 PRINT AT 2,6;"Input number ";x
150 INPUT i(x)
160 PRINT AT 5+l,0;l,i(x)
165 NEXT x
170 PRINT AT 20,0;"Are these numbers correct (Y/N)"
180 IF INKEY$="y" THEN GO TO 3000
185 IF INKEY$="n" THEN GO TO 100
190 GO TO 180
200 PRINT AT 11,0;"You can only input 12 numbers"
210 PAUSE 200
220 GO TO 50
1000 CLS
1005 PLOT 24,75: DRAW 216,0
1010 PLOT 24,175: DRAW 216,0
1020 PLOT 24,75: DRAW 0,100
1030 PLOT 240,75: DRAW 0,100
1040 FOR b=100 TO 148 STEP 24
1050 PLOT 24,b
1060 DRAW 216,0
1070 NEXT b
1080 FOR d=44 TO 220 STEP 16
1090 PLOT d,75
1100 DRAW 0,100
1110 NEXT d
1114 PLOT 24,75
1115 DRAW 20,i(1)
1120 FOR w=2 TO t
1150 LET r(w)=i(w)-i(w-1)
1160 DRAW 16,r(w)
1165 IF w=12 THEN GO TO 1200
1170 NEXT w
1200 GO SUB 3600
1999 GO TO 3005
2000 CLS
2005 PLOT 0,75: DRAW 255,0
2010 PLOT 0,175: DRAW 255,0
2020 PLOT 0,75: DRAW 0,100
2030 PLOT 255,75: DRAW 0,100
2040 FOR x=100 TO 148 STEP 24
2060 FOR y=0 TO 255 STEP 5
2070 PLOT y,x
2080 NEXT y
2090 NEXT x
2130 LET c=0
2150 FOR j=40 TO 232 STEP 16
2190 LET c=c+1
2195 IF c=t THEN GO TO 2555
2200 FOR z=1 TO 5
2205 PLOT j+z,75
2405 DRAW 0,i(c)
2455 NEXT z
2505 NEXT j
2600 GO SUB 3600
2999 GO TO 3005
3000 CLS
3005 PRINT AT 20,0;"Pick graph to be displayed"
3010 PRINT "a.Linegraph b.Bargraph c.End"
3030 IF INKEY$="a" THEN GO TO 1000
3040 IF INKEY$="b" THEN GO TO 2000
3045 IF INKEY$="c" THEN GO TO 3500
3048 IF INKEY$="x" THEN STOP
3050 GO TO 3030
3500 SAVE "xxx" LINE 20
3501 STOP
3600 PRINT AT 9,1;"25": PRINT AT 6,1;"50": PRINT AT 3,1;"75": PRINT AT 13,1;"%"
3610 PRINT AT 13,5;"J F M A M J J A S O N D"
3620 PRINT AT 14,5;"A E A P A U U E C O E"
3630 PRINT AT 15,5;"N B R R Y N L G P T V C"
3900 RETURN
4000 FOR t=1 TO 12
4010 PRINT i(t)
4020 NEXT t

```

I hate to say it, but when my friend Andy Gippetti bought a Timex/Sinclair 2068, I thought that he was crazy. I mean, Timex had just given up on it and there were so many other, more popular 8 bit computers on the market at the time. But \$99 for a color computer with 72K of memory did seem like a good price so I bought one too. And after selling every bit of Atari equipment I owned, I am here to tell you that it is by far the best 8 bit computer I have ever used.

But of course, the one tradeoff in using my 2068 is that there is very little software for it. This, too, has turned into a blessing. I now make my own software.

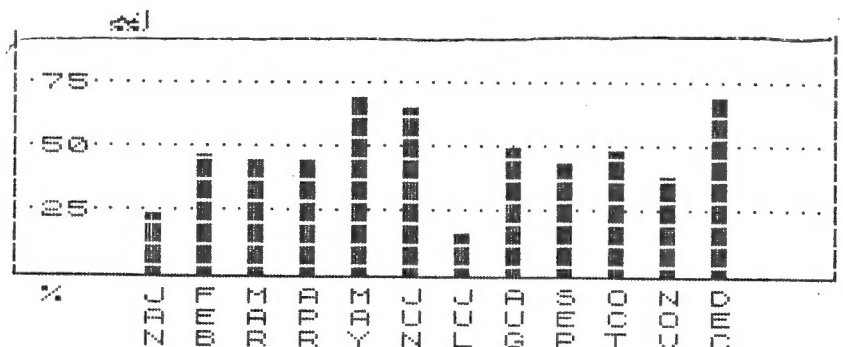
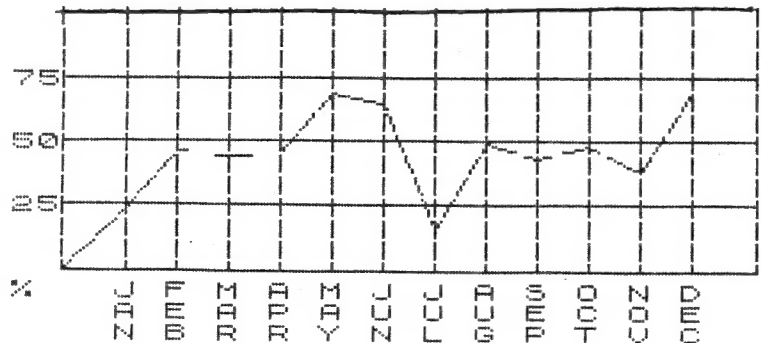
Being a Quality Assurance Engineer, alot of my work has to do with statistics. These statistics have to be represented in a form that will show the top management in my company the good as well as the bad trends in our production line. But the question was, can the T/S 2068 compete in the hi-tech bussiness place with the likes of I.B.M. and Apple. Well I'm here to tell you the answer is yes.

The program below will display a bargraph or a linegraph that will display actual, accurate data. It is not one of those bargraph programs that use the graphic symbol "I" and stack them one on top of another to give the illusion of actual data. If you input 62%, either graph will accurately represent 62%.

This program is a subroutine for alot of my bussiness programs that I use in my job. But it can also be used for programs which track home spending as well as uses in whatever programs you write that need to display data graphically.

The program is self-explanatory. Just follow the rem statments in the program to discover how to customize it to your programs. If there are any questions or improvements to my program please drop me a line at:

John Gaddis
28 Knapp Rd.
Mastic Beach N.Y. 11951



LIST GROUP

SOFTWARE REVIEW: FP COMPILER

FOR: 48K SPECTRUM

FROM: SOFTEK, UK

PRICE: UNDER £20.00

FUNCTION: CONVERTS BASIC INTO MACHINE CODE

Most computer owners know that their machines run something called machine code, which to many is a deep dark mystery. Lots of folks are perfectly content for it to remain so, and that's all right. Still, machine code can be mighty fast, and those who program only in BASIC may feel just a twinge of envy toward the machine code types. Surely there must be some short cut that can allow everyone to tap a bit of that power...

If you find yourself nodding, you'll be pleased to know that a class of programs, called compilers, will do just that, by translating a more familiar language into machine code. In this case, the FP Compiler, by Softek, will turn most any command in Spectrum BASIC into its machine code equivalent, and then goes on to add extra commands that Sinclair "forgot". Spectrum? Sinclair? Well, yes, this program does require a Spectrum emulator to run, but it's one more good reason to join the ranks of the "emulator people."

Some machine code programmers are less than enthusiastic about compilers, which tend to use a "cookbook" approach to their translations, and so seldom produce efficient code. Yet, even the most hardened MC users will find use for this product, because this is a floating point compiler. That is, it uses a special five byte format to represent numbers, which may span over the entire range of values that they do in Sinclair BASIC.

The fixed point number system in the Z-80 instruction set only allows integers, ranging from 32767 to -32768, or 0 to 65535, and most machine code programmers have resigned themselves to this. This is not because Sinclair's floating point calculator software is hard to use; it's not. Unfortunately, very little has been written about the calculator and the new "instruction set" it simulates.

As a whole, then, this program will allow even the newest BASIC programmers to "soup up" their favorite projects. Machine code programmers will be able to patch floating point portions into their code. The truly "hard core" can, with the aid of a disassembler, Ian Logan's Spectrum ROM Disassembly, and perhaps one of those floating point articles, compile simple examples to help them learn to use the floating point calculator. There's something for everyone!

So much for what it does. How well can it do it? Most BASIC compilers can only handle a subset of BASIC, and compilers for the Timex & Sinclair machines have been particularly limited. In contrast, Softek's creation is very complete, although there are a few restrictions. Number and string arrays may have only one dimension. No expressions may be put in DATA statements. INPUT has some very minor limitations. LOAD, SAVE, and VERIFY only work with the CODE extension. GOTO, GOSUB, and RESTORE must be followed by a number, not an expression. Microdrive commands aren't supported. There are a few other things, but all in all, the compiler's restrictions are really not too hard to work around.

Faster floating point code is great, but nothing comes for free. If fixed point numbers will do, (as in updating the position of a cursor, for example) calculations can be done in just a few machine code instructions. Doing the same in floating point format, which the compiler demands, involves the use of long and complicated math routines. This means that it will run far slower, and so this compiler is not the best choice for every program. Still, when you need it, it does a fine job. Also, users who simply don't want to bother with fixed point numbers can still use this compiler to get a significant speed increase, no matter what their programs do.

To give an example of the differences in running speed, some comparison tests were done. The first was a bubble sort, with non-integer numbers, so requiring a floating point program ... well, everyone uses a bubble sort for comparison ... it's tradition, that's why, so there. Using 10 elements, arranged to require the maximum amount of sorting, a straight BASIC program took 2.6 seconds, whereas the compiled version took .83 seconds; a 310 percent speed increase.

A second example, chosen to show the inefficiency of floating point code where it's not needed, involves filling an 8K block of memory with zeros. A BASIC FOR loop that POKEs each location takes 69.9 seconds. The same program compiled took 18.7 seconds. Not bad. Now, this program can be handled with an integer compiler. One such product, (which runs on a different computer, but with a similar clock speed) produced code that

Software Review

did the task in about 1.5 seconds. Quite a speed increase. A machine code loop, with the same program structure does it in about 0.1 second. (This number was calculated.)

Note that compilers simply follow a recipe to translate a program, line by line. They don't have the smarts to look at a group of lines, analyze the task, and realize that there's a simpler way to do it, with the machine code instructions available. The BASIC CLS command uses a neat trick with the LDIR instruction to clear the display file. This same trick will initialize our 8K block in about .05 seconds.

These numbers provide a reasonably good comparison between the speed of BASIC and compiled BASIC. They also compare straight machine code and the occasional lucky short cut that so brighten a programmer's day upon their first discovery. Lastly, they show that compilers can really help, but there will always be places where straight machine code is the only way to go. This is not intended to malign compilers. They'll put extra zip into sluggish BASIC programs, with very little effort, but they can't do magic.

No review would be complete without a couple of nasties, so I'll oblige. Most compilers include a "run time package" of subroutines that are used by the compiled code. Many compilers allow this package to be located wherever in memory you desire; the FP Compiler does not. Instead, this package remains imbedded in the compiler, and so the entire compiler must be saved with your compiled code, in order for it to run. The compiler takes up about 6K at the top of memory, and so you'll have to locate your compiled code somewhere nearby, if you want to SAVE the smallest possible code block. Although this made the compiler easier to write, it wasn't necessary. It's unfortunate.

If the above paragraph seems a bit confusing to you, be assured that you needn't understand it at all to use the compiler. Once you follow a few steps by step instructions, everything else will be done for you. Just be warned that if you know any MC programmers who need something to complain about, this will be at the top of the list.

Because the manufacturer retains the copyright on the run time package, it's usually not possible to market code made with the compiler, without paying royalties. The Softek people have very generously given permission to sell such code, as long as they are given credit for the use of their compiler. While this is commendable, it's also very surprising. After all, they're allowing strangers to "give away" a free Softek compiler with every program they sell (remember, the compiler has to be saved with the compiled code.) Then they must advertise that the free compiler is in there! This is not a complaint; merely a confused observation.

If you want to get fancy, it's perfectly OK to go back and forth between BASIC and your compiled code. This will allow your programs to include microdrive commands, as well as the unsupported types of cassette and INPUT commands. (None of these will be noticeably slower running from BASIC, anyway.) In effect, your compiled code becomes just another BASIC subroutine.

Only subscripted variables are passed between BASIC and the compiled code. If you use the same non-subscripted variable in both BASIC and compiled code, they will be treated as two separate variables. Beginning programmers will find this confusing until they get used to it. Some who've worked with other languages will recognize these as "global and local" variables, and will find them useful. The probable reason things are arranged this way is that it takes a long time to scan through the BASIC variables area, and local variables outside this area can be accessed more quickly. So it buys us some speed. It's both a blessing and a curse, but I think it was the right choice.

In summary, the compiler is very easy to use, compiles almost all BASIC commands, and gives a noticeable speed increase. It's not intended as a substitute for machine code, but what it does, it does well. My gripe, which I've stated, are minor, and many users won't even notice them, let alone be bothered by them. As such, the program rates a 9 out of 10, and I recommend it highly.

Wes Brantowski

: Since your 2068 BASIC programs will LOAD and RUN on a Spectrum (unless they're too long or contain the unsupported commands FREE, STICK, ON ERR OR SOUND), those of you with emulators can compile your BASIC programs for Spectrum mode. The compiler will not work in 2068 mode.

PROFILE-PLUS and INFORMATION 11

By Michael B. Williams

Published by: Williamware Software, 1300
Depaul Way, Virginia Beach, Va. 23454

Software Review: By Steven Kaye

What? More databases? This was my reaction when I first studied these programs for review. My first impression was that these two programs were simply Profile look alikes with some new frills and poor quality documentation.

However, after several days of testing I came to the realization that while the programs may have some rough edges, efficient, machine-code programs containing a built in fast load system and what seems to be the ability to save/load data files, is a real programming accomplishment. With only a limited number of software manufacturers, and distributors willing to support our computers, we should all welcome and support new software authors that are willing to take the chance and market their creations.

The selection of a database for any specific application is a very difficult choice. In my opinion, a database is the single most important piece of software that a microcomputer user can purchase. The real magic of a computer is its ability to store, retrieve and manipulate large quantities of data rapidly and efficiently. For many users, Tom Woods' ZX Profile is the ultimate Timex Sinclair (ZX 81) program because it offers both machine code speed and excellent documentation that permits the user to create - do- files and customize it for specific applications. ZX Profile does not meet my individual needs and I use another database, Filedata 2E by 21st Century Electronics. It contains 2 features that most database users would find of limited usefulness, yet are necessary for my individual applications: the ability to alphabetize the entire listing of files, and the fact that the entire program consists of basic subroutines that are coupled together. This permits me to modify the program whenever I must print out data in specific applications, such as inside character strings, that are composed simply by writing several lines of basic.

It is clear from my own personal experiences using a database for over 2 years, that each database contains differences that may be suitable for an individual's custom applications. The problem with the programs being reviewed is not in the unique features offered, but in a lack of clarity in the documentation. For example, the documentation provides very poor information on the printing of files. I was not sure whether these programs supported the Timex 2040 printer or an 80 column unit. After much experimentation, I managed to get the programs to print out data on my 2040. I am not sure if the same software will support 80 column units since I do not have the equipment available at this time.

My recommendation is that Timex Sinclair users should consider the purchase of these programs as valuable additions to their software libraries because these two programs offer the potential of being developed into powerful and useful pieces of software. Unfortunately, they cannot be used when first taken out of the box. They will, like Tom Woods' program, require considerable experimentation. Which one of the two programs to buy is also an individual decision. Profile plus offers the flexibility of permitting the user the opportunity to create the file format, while Information 11 offers the convenience of predefined files containing the standard items: name, address, city, state, zip code, and phone number. If you simply choose to use your database as an electronic directory than Information 11 may offer the user greater simplicity.

Both programs surprised me with their loading ease. My computer, with a 64k memory that is not switchable, has caused me many problems when using assembly code software and fastload programs. I have had no difficulty with loading and saving. If this is an important consideration for you, then these programs may be the ideal databases for you.

As I have stated previously, I recommend that we welcome and support Michael Williams as a major Timex software author, and purchasers should feel free to write to the author/publisher, at the address provided, to suggest improvements and modifications that will improve the documentation and make the software easier to learn. In this way, new revisions of the software will be easier to learn.

Steven Kaye

For Timex/sinclair 1000, 1500 and ZX 81 computers

C. LUCHT
WESTLAKE, OHIO
44145 3-29-85

LIST
P.O. BOX 433
CENTERPORT N.Y.
11721-0433

GENTLEMEN,
Please send me three of your spectrum roms. Also can you sell me or tell me where I can get a rom for my 2068.
I have an English Tasword two. Can you tell me how I can get it to work with my AERCO interface and a star S.G.10 printer.
I can't get the printer to copy either. It will run a page but the head doesn't print. Any suggestions will be tried.
I wouldn't bother you with my problems if I could get around, but I'm seventy five years old and in a wheel chair, so I don't get around much any more.
I'm enclosing a check for \$45. for the spectrum roms.
Do any of your members have an English spectrum that I could buy and convert to 110 volts.
Of course I'd have to buy an English interface to run my STAR printer then, but that would solve my problem. Do you think that a TIMEX 1000 would run both star printer and Tasword 2?
With the AERCO interface of course.

Yours truly,

Clarence Lucht

See the "Printout" Section. Thanks again to SUM.

List
Group

We began exchanging with SF ZXUC some time ago, but to an address in Lake Park, Fl.

7

VENDOR REPORT

VENDOR

T-Ware (406)-452-5673
40 Aspen
Great Falls, MT 59405

21st Century Electronics
PO Box 5037
Guttenberg, N.J. 07093

Curry Computer
5344 West Banff Lane
Glendale, Az. 85306

Scott Foresman or Co.
1900 East Lake Avenue
Glenview, Ill 60025

E.A. Brown
3404 Pannee Drive
Alexandria, Mn. 56308
612-762-8847

English Micro Connection
15 Kilburn Ct.
Newport, RI 02840
401-849-3805

PRODUCTS

TS-1000 (tape or Areco)
T-File - MR. Math, Spellword (each 10.00)

MScript - \$69.95 + 3.50PH
Multi Draw \$19.95 + 3.50 PH
Quicksilver @ List Price
Memotech

Spectrum Software
Ant Attack \$10.95
2068 Software 6.00
(e.g., Budgeter, Crossfire etc)

GENERAL DESCRIPTION

Designed for beginning-to-intermediate BASIC programmers. and owners of the Times/Sinclair 2068, this book helps readers polish their BASIC programming skills. This book includes numerous programs, a collection of helpful programming techniques, and tips for making flow charts, debugging, and error trapping. Sharon Aker provides programs that can help readers generate random numbers, use trigonometric functions, make music and sound effects, use logical expressions, use PEEK and POKE commands, and more.

New Book:

T/S 2068 BASICS AND BEYOND

Sharon Zardetto Aker

March 1985, c 1985, 208 pages, softbound, illustrated,
7-5/8 x 9-1/4", \$9.95, ISBN 0-673-18109-X

\$9.95 - User Group gets discount

Fairly complete line of Hardware & software. List Price on most items. Takes plastic. E.g., Romswitch \$54.95

Spectrum +, Microdrives, Software
TC 2068, TC 2068 Disk Drives etc.
REasonable prices - no plastic
TC 2068 Disk Drive assy. \$259

11601 Whidbey Dr.
Cumberland IN 46229

To: John Olliger Co. customers

From: John Oliver

Subject: Available products for the TS2068 computer and future products for this computer....Updated 3/20/85

Dear Customer,

I would like to announce the availability of the 2068 epron programmer. It IS now available, and capable of programming 2764 and 27128 type epron. The pc board, I believe, is one of my best....it contains absolutely NO wire jumpers, feedthrough wires, or cut pinned sockets, as my TS1000 programmers are riddled with. It is now available immediately from stock, and its purchase includes a booklet written for the project. It is designed to plug into your 2068 4-105! Expansion board, from John Oliver Co. Its price is: Bare Board=\$12.95.... Board w/part=\$25.95....Assembled & tested=\$33.95.....I also have a FEW of these boards available with Gold plated edge traces at the following prices, available only while supply lasts: Bare Board=\$18.95....Board w/part=\$31.95....Assembled & tested=\$39.95. Please be advised that you will need either the Vpp power supply (rec., same one used for TS1000 para, if you already have one) @ \$4.49 bare board or \$9.95 for board w/ board mounting parts or your own power supply capable of the voltage adjustment range from 4VDC to 22VDC used along with a Voltmeter.

I could also like to announce the availability of my newest 2068 product, the OLIGER 2068 PARALLEL PRINTER PORT. This Centronics type parallel printer port is the lowest priced full size printer I/F available for the 152068 anywhere, but is lacking in NO details. If you have the OLIGER 2068 expansion board, you can interface your 2068 to ANY full size printer that uses a Centronics type interface for a only \$47.90 in its assembled & tested w/cable form. (add \$3.00 for gold plated edge traces) Even MORE of your hard earned money can be saved by purchasing the port in one of its many kit forms. See the recently revised OLIGER 2068 Product list for complete prices of kits and more details. The pc on this project DOES have plated through holes and is easy to assemble.

I plan on many more products for the 2068, after the port, the first will be a joystick port board for use with Spectrum software. This w/RomSwitch or emulator that also has an Olliger expansion board. This port looks to the software exactly like the Kempton joystick I/F, but this port IS fully decoded, so there can be no conflicts with other third party hardware on your system. The port will be reasonably priced and avail. around the first of March. There will be more after this one, but as I am not yet going to commit myself to just what.

Another project for the future is a disc drive controller for the 2068, the hardware of which will be designed by amsvic and the software to be written by none other than Ray Kingsley of SINGARE! This project will take some time to develop. Both hardware & software, so I don't look for it tomorrow! It is hoped that this controller can be made to respond like the Sinclair Interface One with Microdrives, and use all the Basic supported keywords. Ray is also going to try and implement CPM for the 2068 with this controller.

Also, it may be of interest to some of you that Syncware News has been and will be publishing in the future, selected projects offered by myself as construction articles in this fine journal. You can subscribe to Syncware News by sending \$16.95 (\$19.95 Canada) for 1 year (6 issues) to Syncware News P.O. Box 64 Jefferson, NH 03583.

Thank You.

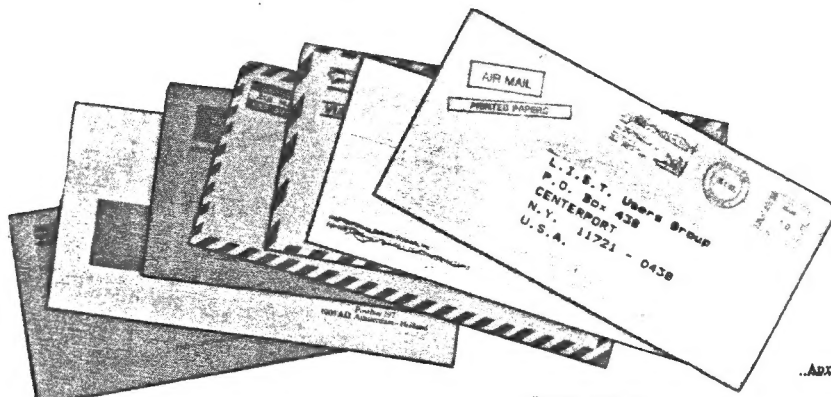
John L. Olliger

THE ELLIOTT CURRY CASE

[illegible]

LETTERS

List Group



April 18.....19.....85

From the desk of:

PAUL J. DONNELLY

To:

Richard C.

I can only help, right now, with question #2.

Use the system variables to find that line # and change it.

Use a header reader to find the length of the program. Next write a short routine like this:

```
XXXX FOR I = NEAR_END TO NEAREND+50:
PRINT I; " ";PEEK I: NEXT I;STOP
```

Where XXXX is an unused line # NEAREND is some arbitrary address near the end of the program. E.g., if the program is 10,000 bytes long. Near end could be 33,500 or so.

GOTO XXXX and look at the Peek's, you should be able to identify the BASIC lines from the description of how BASIC lines are set up in the manual and the character codes.

When you reach the offending line, you'll probably find an illegal character. Poke in a legal value and all should be O.K.

Leonard Adler
725 West 154th Street apt 4k
NY, NY 10033

3/24/85

Dear LIST,

Thank you for sending me your sample newsletter. I found it interesting. However, due to financial reasons I find that I'm forced to sell my T/S 1000. I'm interested in selling my hardware and software to the LIST at a price lower than what I might usually ask because I know it would be going for a good cause. Thank You

Sincerely,

Leonard Adler

P.S. if you are interested please write to me before you send any B.

Here is a list of my products

Hardware

T-S 1000 (1 yr old)	24.95
with all cables, switch box, etc.	
16K RAM	20.00
or	
T-S 1000 + 16k	40.00

Software

Flight Simulator	\$ 8.00
Vu-File (Organizer)	\$ 8.00
The Budgeter	\$ 8.00
Chess & Chess Clock	\$ 8.00
Grimm's Fairy Tales	\$ 6.00
Meteors 16k (Softsyne)	\$ 6.00
Hangman 16K	"

or
All 7 for \$35.00

or Everything Here for \$65.00

Sometimes you win sometimes you lose.

How "letters" work - A Bootstrap

We receive dozens of requests for information each month. Some are general in nature, but most ask us specific questions about hardware, software, and compatibility.

Since we don't (and can't) have all the different types of HW & SW available, your editorial staff simply can't answer all the questions raised. We try, e.g., by sending pages from back issues of LISTING or referring the questions to another source of information, but we need your help.

If you see a question in the letters section, and you know the answer, please send the answer to LISTING and/or the individual. If you send it to us, we'll publish it and pass it on.

Oh yes, we don't print members street addresses unless told specifically to do so.

Richard C's request is typical. I don't have a TASMAR interface and thus, don't know how the software for the interface is made available to the system.

Assuming that the software printer drivers reside in RAM, here's a theoretical solution:

POKE 64716,201: POKE 64719,201

201 is C0000000 or Return, so nothing will happen. To reactivate the TASMAR interface though you'd have to POKE back the original codes stored at those memory locations, or peek them first - write the values down. This could all be done from BASIC.

Dear L.I.S.T.

Thank you so much for responding to my inquiry. I enjoyed the sample issue (Feb 85) very much. I'm enclosing a check for you and I hope to correspond with you as well. I haven't found a single person in the Brooklyn area who uses Timex Sinclair machines. So all of my information about these computers has to come from books, magazines and news letters. I purchased a Timex Sinclair 2068 about 1 1/2 years ago and shortly after the purchase I reached a point where I am beginning to assimilate the vocabulary of 2-80 machine code.

Along with my check for membership, is a listing of two short routines that I have written. The use of the Sim Statement to store plot values could possibly be very useful in other applications. The first routine was a nested loop in conjunction with the draw command.

The second routine was a stepped variable and a loop to multiply the draw command.

If you want, I can give you a more explicit breakdown of these routines. Anyway I hope you can take a little time to enter them on a 2068 and take a look.

Again many thanks,
Patrick Fagan

Patrick Fagan

BROOKLYN, N.Y. 11230

PATRICK

Please do-sounds like an interesting article.

P.D.


pleasan/rees
PROGRAMMING
P.O. Box 2034 Mesa, AZ 85204

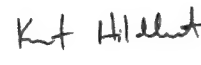
Kurt E. Hildebrant
Huber Heights, Ohio 45424
April 8, 1985

Dear Paul,

Thanks much for the Spectrum disassembly. I was really stuck on some 2068-to-Spectrum compatibility problems, but the book answered all of my questions. Please let me know how much the postage cost so that I can reimburse you. Thanks to Nazir, also, for the book!

The terminal program is coming along very well. I finally got John Olinger's Centronic printer interface. This is John's finest product yet. It is a tiny (about 2"x4") board that plugs into his expansion motherboard and connects to any parallel printer via a ribbon cable. The instructions contain complete source listings for LPRINT/LLIST software and several screen dump routines. The software is also available on tape for a mere \$6. This printer interface can be had for about \$50 complete in kit form. With Epson RX-80 printers going for \$199 now, there is no excuse for using your 2040 printer anymore! Needless to say, I plan to support this interface in my programs.

I recently spoke to Ray Kingsley about the Olinger-Kingsley disk interface. Ray has the hardware running currently and has written most of the low-level support routines. He sees no obstacles to a CP/M operating system for the 2068. Of course, the DOS will make Ray's HOT-2 (already the definitive 2068 development system) even more powerful. All you 2068 HOT-2 fanatics out there might write Ray via SINWARE and encourage his marvelous but under-paid efforts!


Kurt Hildebrant

OUCH!

Paul is right about Time Design's improvement. We thank him for the sketch. I chose it as the best and we're not surprised that it was his. Paul's criticisms are well intended and well taken. You might want to visit a Mercedes repair shop and check out the prices though. The faintness you see in this copy, was in the original.

March 25, 1985
West Covina, Ca. 91790
USA

SMT
Greens Norton
Towchester, Northants, NN12 8BR
England

Gentlemen:


I have reviewed your offer in the March "Sinclair User" for the ROTRONICS Wafadrive for the Spectrum. As I am using the American version of the Spectrum, the Timex Sinclair 2068, I am enclosing my order. (Our ham radio Sinclair net has already verified that the WAFADRIE works on the 2068 when a Spectrum emulator ROM is in the cartridge dock and the Z-Link interface adaptor is used.)

As the non VAT price is 99.95 pounds I am enclosing 99.95 x \$1.20 or \$120 plus \$15 for airmail postage or \$135. The Rotronics is especially welcomed as it uses the Entrepro system "stringy-floppy" wafer from Sunnyvale, Ca. that are available here. This is its main advantage for the American market as the Spectrum interface/drives are not using an available wafer except from Sinclair.

This letter is typed on the TS-2068 and printed on a Brother EP-44 dot matrix using the Tasman RS-232 Interface and Tasword 11.

Sincerely yours,

Bob Howard


Time
Date
To
From
Subject
Comments
...
Time
Date
To
From
Subject
Comments
...

Dear Paul, March 23, 1985

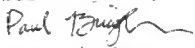
Where do I begin? I have so much I want to vent.

Perhaps we'll start with L.I.S.T.'s copy shop... Paul, the March issue was surely brimming with great stuff as always, but nearly half was indecipherable. Let's give the copy place the deep six and find one that can do the job!

A comment on page four says Time Designs Magazines first issue was a lightweight effort. That may in fact be true, I never saw issue number one. I did just receive their third issue and its pretty darned full of good 2068 drive info. Better check it out.

Now to the A & J Micro Drive model 2000 review. The perspective sketch you included was of my own creation. I don't mind at all you using it. It did take me hours to draw, though, just a word or two on its origin would have been nice. As for the letters on the model 2000, they echo many remarks I have heard: it is a simple device which is simple to use. It is backed by good people. Annette & Jim Howell (A & J) are to be commended on bringing to market an affordable alternative to the cassette recorder.

As for Kurt H's letter regarding the model 2000: it was pretty sour. He not only complained about the drive but about his 2068 as well. Let's face it, his PC has changed him. But then none of us could trade our Mercedes back for a Tercel and feel any happier. 'Guess he's just glad he didn't buy the PC jrl

Best regards,

Paul Bingham

MEMO FROM THE DESK OF:
RICHARD J. CUNNINGHAM

DATE: APRIL 6, 1985

DEAR PAUL,

MANY THANKS FOR THE BACK ISSUES OF LIST. I NEVER GOT THE APRIL ISSUE HOWEVER. DID YOU SEND IT? SENT MY CHECK TO YOU ON MARCH 23.

I MENTIONED IN MY LETTER OF MARCH 23 THE PROBLEMS WITH MY A&J MICRODRIVE. WELL I NOW HAVE TWO DRIVES. THEY RETURNED THE ORIGINAL WHICH WORKS FINE AND THEY SENT THE "NEW NEW" DRIVE. THE DRIVES TAKE DIFFERENT WAFERS.

PRESENTLY I AM TRANSFERING ALL MY TAPE CASSETTES TO WAFER AND AM ALMOST DONE. IT'S EASY. LOAD FROM THE RECORDER AND SAVE TO THE MICRO. TASWORD 2 HAS ADOPTED PERFECTLY. I HAVE BOTH THE 2040 PRINTER AND THE OLIVETTI PRINTER HOOKED UP TOGETHER AND CAN SELECT EITHER ONE.

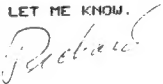
I HAVE A FEW QUESTIONS MAYBE SOMEONE CAN ANSWER.

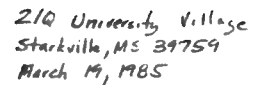
1-IS THERE ANY WAY I CAN DEACTIVATE THE TASMAN INTERFACE (RESIDES AT 64716.652. RANDOMIZE 64719 TO ACTIVATE PRINT. RANDOMISE USR 64716 FOR SCREEN COPY). IF I COULD DEACTIVATE I COULD SWITCH BETWEEN PRINTERS WITH NO PROBLEM AND ALSO LIST WITHOUT TASMAN PICKING UP THE GRAPHICS CODE INSTRUCTIONS.

2-I AM TRYING TO CONVERT THE TIMEX GOLF CASSETTE TO WAFER. IT IS WRITE PROTECTED AND THE LAST PROGRAM LINE HAS NO NUMBER. IT READS(2383 RESET COPYRIGHT R&R). WHEN I CALL THIS LINE DOWN TO EDIT IT CAN ONLY BE ERASED NOT CHANGED AND IT CANNOT BE REINSERTED IN PROGRAM. ANY SAVE ATTEMPT GIVES AN ERROR CODE FOR THAT LINE. ANY IDEAS??

3-HOW CAN I RESERVE SPACE FOR A SPECIFIED NUMBER OF BYTES BY USING A DUMMY PROGRAM. I WANT TO RESERVE SPACE ON THE A&J WAFERS FOR PROGRAMS THAT EXPAND SUCH AS UUFIL WHICH INCREASES IN SIZE AS FILE IS INCREASED. OTHERWISE THE ENTRIES WILL EVENTUALLY OVERWRITE THE NEXT PROGRAM ON THE WAFER. I HAVE ADOPTED UUFIL CASSETTE TO THE WAFER.

IF YOU WANT MY EVALUATION OF THE A&J MICRO LET ME KNOW.





Sinclair Research Limited
50 Stanford Street • Boston • MA 02114
Telephone 617-742 4826

New York, NY 10002

Dear Mr. Chomitz:

Thank you for your recent letter regarding the Sinclair QL. Following are responses to your particular inquiries.

1. We do not yet have FCC certification to sell either the QL or its power supply. We expect to be shipping product in May and if you re-contact us then we will be happy to sell you a power supply unit.
2. A US television will not work as display for a UK QL because of the difference in television standards (NTSC here vs. PAL there) You can, however, use any RGB color monitor with a QL. I am enclosing information on the necessary monitor interface. We will be selling monitor cables with the QL connection. We also plan to offer a QL color monitor for sale in the US concurrent with or shortly after, QL launch.
3. All expansion systems, software and applicable peripherals that are possible to be brought in and sold in the US will be imported.
4. Any domestic serial printer will work with the QL using an RS232 connector.
5. I am enclosing a product brochure, although I suspect you are looking for more technical material. QL reviews will begin appearing in the early summer. Creative Computing reviewed the QL in a late 1984 issue. Sinclair owners who enroll in the QLUB will receive bi-monthly newsletters with updated product information. There are a number of UK magazines devoted to the QL.

The problems that you are facing are the downside of having acquired a machine before it is available on the US market. However, upon launch you will see full support services for QL owners in the US.

Yours sincerely,

Mary [?]

Mary E. Reinman
IIS Marketing Manager

MER: 1m
 Enc.

Directors: Sir Clive Sinclair, Chairman; Nigel Searle, Alan ...
 David Croft, Richard Cutting, William Matthews, ...
 ... James Westwood, Non-Executive: ...
 ... Christopher ...

Ian F. Robertson
26 Abilene Drive
Islington, Ontario
Canada M9A 2M8

March 23, 1985

Dear Sir:

Enclosed please find \$15.00 (U.S.) to subscribe to your TS newsletter. If this is not enough money for a one year subscription then please include a request for additional funds with my first copy.

If it is possible to start my subscription with the January 85 issue I would appreciate it.

My TS system consists of (11) TS1000/ZX81's, (1) TS1500, (2) TS2068's (with Spectrum ROMs), (1) TS2C50 Modem, (1) TS2040 Printer, (1) 80 column printer and assorted printer interfaces, eeprom burning equipment (TS1000 & TS2068), assorted memories, assorted TS1000 Roms, assorted keyboards for the TS1000 and quite possibly the BEST TS Software and Book Library in Canada.

Looking forward to receiving your Newsletter, I remain

Yours truly,

Jan E. Robertsoo

Dear Mr. Donnelly,

I appreciate your input. The AERCO interface won't be available for at least another month. Before I order, I am going to try to use software to interface. You mentioned FIRST LOADER from Spotted in Feb '84 but I didn't know which magazine you referenced. Also, I have not been able to locate your Syracuse news article. We just don't seem to have many of the Times related publications here. I am enclosing \$300, if you don't mind sending me a copy, to cover copy cost, mailing, etc. Power Projects by Jim Stephen is an excellent book & I think I will be able to use the material in it. I also found a DC to AC converter to allow the use of a printer in some cases. Our goals of the project were (a) to obtain digitized points (instead of an analog graph) and (b) to directly input the data into a data file on IBM. Both of these goals would decrease the cost in terms of labor and instrumentation and increase precision. I'll send you a copy of my final report in May. I would also like to request your permission to use your LED output article, with proper reference if needed. Thank you for your cooperation. Sincerely,
Dr. W. Walker

Jess Peeler
Apdo 41 Pavas, San Jose 1200
Costa Rica, America Central
12 March 1985

LIST Group
POBx 438
Centerport, N.Y. 11721

Dear Listers:

Enclosed is another squib on the TS-1000.

Will you pose to the members - or post on your bulletin board the following information requests, please? All relate to ZX-81/TS-1000.

- (a) Commercial tapes - Who sells a Contract Bridge program and who sells an Electronic Filter Design program/ and if they have gone out of business, would someone with same be willing to sell me a copy?
- (b) Can someone make me a copy of Part 2 of Ian Logan's "Understanding Floating Point Arithmetic", located in either Mar/Apr or May/June SYNC of 1982?
- (c) Does anyone have technical info on the Westridge MODEM? I would like to obtain a MODEM, but do not like being limited to the 300 Baud that the Westridge runs at. What I need to know is if the control interfacing is done by hardware or software (And, if hardware - I need schematic diagram/ if Software - I would dearly love a copy).

Sincerely yours,

Deception

Tape Worry M's

In this section we will begin a continuing series on problem #1; tape Loading and Saving. If you have a technique which might help others, or problem tape you can't load, write into TAPEWORMS.

LOADING BALKY TAPES

At the first loading failure experienced, I clean the play head in the tape player with a head cleaning tape and liquid cleaner. This usually clears up any tape loading errors with tapes that I have recorded.

When a tape made by someone else won't load, no matter how many times I vary the volume control setting on the player, then I make a direct copy using tape machines and a Winky Board. This never fails to allow loading, with the exception of a cassette with poor quality tape.

Bob Gilder

A NEAT TRICK

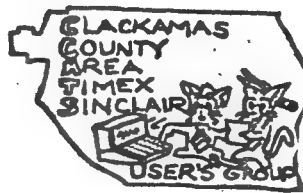
A TRICK FOR SAVING WITH T/S1000
Dick Wagner

This suggestion is from the OCT, 1984 issue of the newsletter TIMELINEZ. CPT Charles R. Byler suggests this routine: for SAVING auto-run MC programs just ENTER FAST and then RAND USR 836, and then PLAY to LOAD the tape. Ends with C/O. The program listing is displayed on ENTER so you can find the SAVE line. Copy to a new tape with GO TO line number and ENTER.

RAND USR 836 initiates the LOAD command routine at Hex 344 in ROM.

I tried this with Flight Simulator and it worked.

Thanks to:



CASSETTE LOADING HINTS FOR TIMEX COMPUTERS

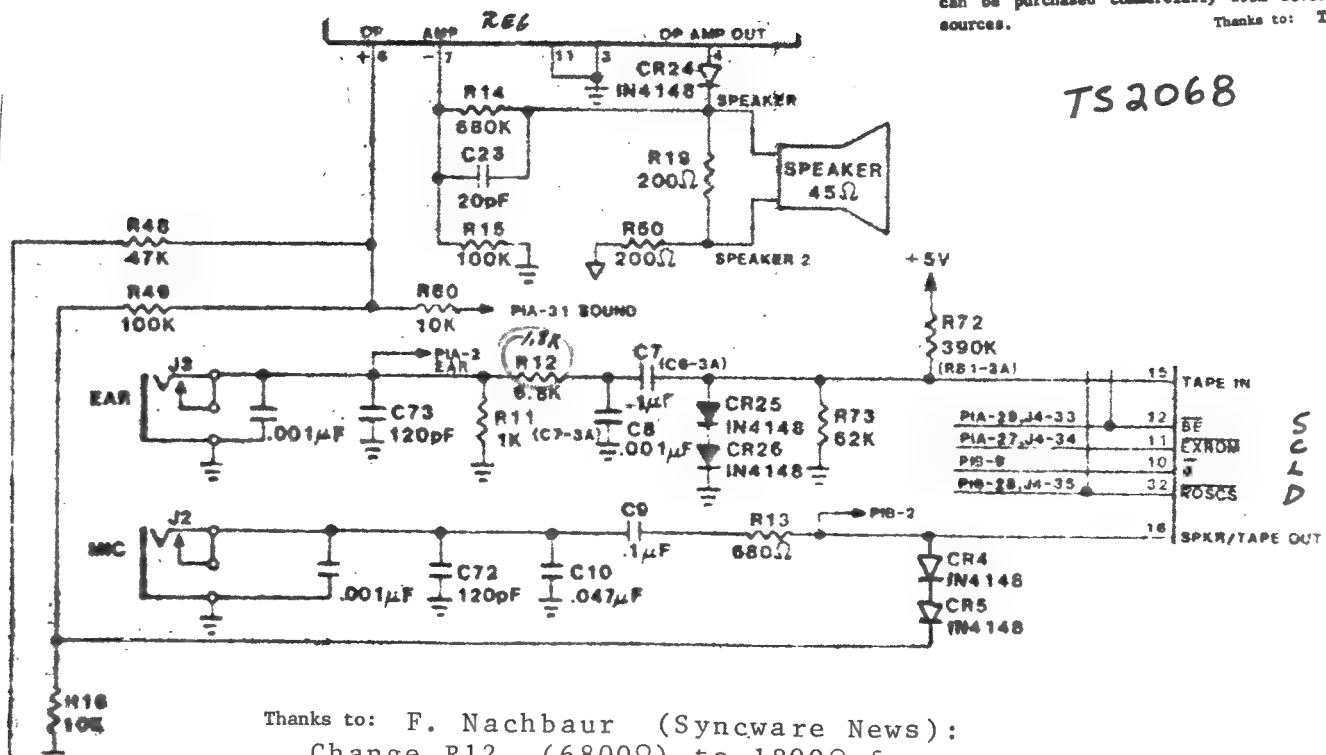
By: John Bell

The most annoying problem I have had with my T/S 1000 is not being able to load programs. If you have tried all the suggestions in the manual and still have problems, try the following techniques. Using them I get a good load on the first try nine times out of ten.

- Save your programs on a quality tape. Sixty-nine cent specials may work, but why take chances? I use any quality 45 minute normal bias cassette tape. (Maxell, Memorex, TDK, etc..)
- Try another tape recorder. Some really do work better than others. I've found the pocket size machines usually won't work.
- Keep the cassette recorder clean and demagnetized. A cassette type demagnetizer works fine. Clean the tape heads and pinch roller by hand. Perform these procedures every five to ten hours operating time.
- Run the tape recorder off batteries. Don't use Nickel-cadmium rechargeable cells. They only put out 1.2 volts compared to 1.5 for regular batteries. That's over a 1 volt drop for the average tape recorder!
- Keep the computer, tape recorder and cassette tapes at least two feet away from the television, especially when you turn it on. Electrical fields from the set can magnetize tape heads and change bit patterns on program tapes.
- The use of a tape loading device might help. See T/S HORIZONS, issue 3 for plans, or one can be purchased commercially from several sources.

Thanks to: TSH

TS2068



Thanks to: F. Nachbaur (Syncware News):
Change R12 (6800Ω) to 1800Ω for
better LOADs.

Printout

This continuing section will provide info on interfacing printers with your system. Again, your tips and hints on adapting software and hardware to run with T/S systems are urgently needed.

REPEAT PRINTING WITH TASWORD II

The following program, when entered into TASWORD II basic portion of the program, will allow the user to select the number of copies to be printed and to abort printing if desired.

```
251 LET i=14: PRINT AT i,8;"No.
of copies? (1)": GOSUB 6000: IF
a$="" THEN LET a$="1"
252 LET k=VAL a$
277 OPEN #2,"p"
278 FOR i=1 TO k
279 OUT 63,127: REM Deletes the
last character in the printer bu
ffer
281 CLOSE #2: CLS: PRINT AT 19,
0; "Press the q key to quit prin
ting"
282 IF i<k THEN PRINT #0;"Press
any key (except q) for next copy
"; PAUSE 0
283 IF PEEK 23560=113 THEN LET
i=k
284 OPEN #2,"p":NEXT i
288 CLOSE #2
```

After entering the program, enter "RUN", go back into BASIC and save a copy of TASWORD II.

This program appeared in "YOUR SPECTRUM" magazine.

YOUR SPECTRUM Subs
14 Rathbone Place,
London W1P 1DE
England
25 BPS for subscription
American Express and Visa cards
accepted.
Excellent publication.

.....Bob Gilder L.I.S.T. GROUP

FROM THE SUN T/S N/A
OF GAINESVILLE, FL.

FLASH!
POKES FOR SPECTRUM ROM
TASWORD WITH AERCO

For those who have converted their 2068s to run with the Spectrum ROM there is good news! Joe Williamson has discovered the pokes necessary to run the Spectrum version of Tasword II with the Aerco inter-

face. First load the Aerco software then the Tasword II program. Get into BASIC by holding down on the 'symbol shift' key and pressing STOP. Select Basic from the menu then type in the following pokes without line numbers, pressing enter after each line.

```
POKE 57999,127
POKE 58004,78
POKE 58008,127
```

Now return to Tasword II with RUN and ENTER. Save your new version of Tasword II as offered by the same menu which got you into Basic.

-- Richard Cravy

2040 PRINTER TIP

Add the missing edge to your 2040 printer. It is easy to make an effective paper cutting edge for your printer by taking the serrated metal paper cutting edge from a waxed paper box, cutting it to the width of the 2040 paper exit port and cementing it in place with epoxy cement. Allow the glue to dry for 24 hours prior to use.

Following this modification, you can restore the appearance of your unit by taking a black permanent type marker and colouring the cutter edge to match your printer.

Steve Kaye

PROGRAMS

This RE-REPRINT is from ZX Forum

Banta Software has provided an interesting program to us.

ON/OFF status of TS2040 printer

"As must be obvious, the REMark statement is a short machine code routine which must be the first line of the program. The other lines can be anywhere in the program and could be modified to give other messages. In the 1000/1500 version the inverse character in line 1 is "S". Also the less than/greater than in the 2068 version and the less than/equal in the 1000/1500 version are each single key-stroke entries.

2068 Version

```
1 REM FLASH CLS G THEN LN
9996 LET PRT=USR (5+PEEK 23635+2
56*PEEK 23636)
9997 IF PRT 16383 THEN PRINT "PR
INTER OFF"
9998 IF PRT =16383 THEN PRINT "P
RINTER ON"
9999 STOP
```

1000/1500 Version

```
1 REM = CLS ?SCS STAN
2 POKE 16516,71
9996 LET PRT=USR 16514
9997 IF PRT>16383 THEN PRINT "PR
INTER OFF"
9998 IF PRT =16383 THEN PRINT "
PRINTER ON"
9999 STOP
```

See the communications page for an AERCO/M Term patch.

TIMELINEZ

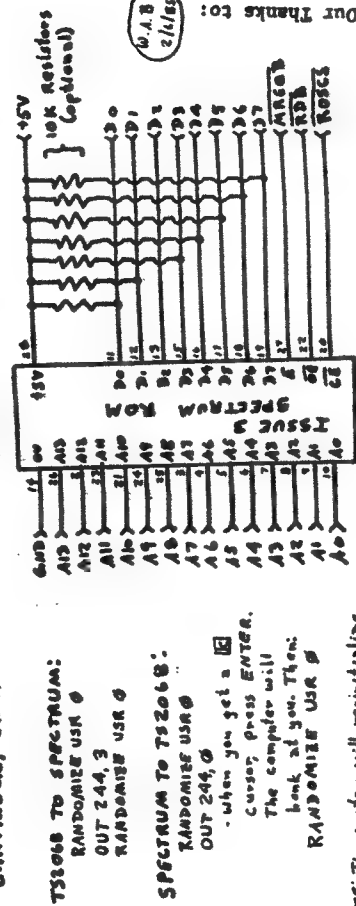
HARDWARE COMPATIBILITY CHART

TS 1000 ZX81	TS 1500	TS 2068	SPECTRUM	TC 2068	COMMENTS
ZX PRINTER OR GIMEX 2040 OR ALPHACOM 32	X X X	X X X	X X X	T T T	
16K RAM PACK	X	X(adds 16)	A1	A2	32K On for 1500 & Spectrum
COMMAND CARTRIDGE ADAPTER	X	X			
HUNTER BOARD	X	T	A1		8-16K
JS2050 MODEM	X	T	X		I/O Mapped
8X MICRO DRIVE		A3	X		ROMCS
ZEBRA JOYSTICK ADAPTER	X	X	X		I/O Mapped (etal) (IN31)
PARROT VOICE	X	X	X3 (T)	?	(Needs 9V) (etal) (67)
ZEBRA GRAPHICS TABLET	T	T	X3(6T)		" (OTO15)
WIMPSTON JOYSTICK	T	T	X		" (IN31) (etal)
DK'TRONICS IGHT PEN	T	T	X		
ZEBRA LIGHT PEN	X	T			
MINKY 2000	T	T	X		
BYTE BACK BB-1	X				

The chart above is based on personal observation. If you know of other items and their status please let LIST know, and we will post your observation.

key - T = Theoretically useable - not tested
 X = Buss compatible (software may be required)
 A) = Adaptable see notes:
 A1 - use bank switching and Zebra board
 A2 - use Stephen Adams boards - 16K Spectrum only
 A3 - needs OMNI-EMU or equivalent
 A4 - Internal adaptation possible
 X3 - (adapted 2068)

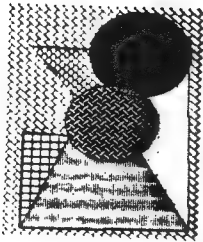
EXTRA SIMPLE SPECTRUM EMULATOR. MAY BE BUILT AS A PLUG-IN CARTRIDGE, OR ATTACHED AT THE REAR CONNECTOR.



TS1000 TO SPECTRUM:
 RANDOMIZE USER 0
 OUT 244, 3
 RANDOMIZE USER 0
 SPECTRUM TO TS2068:
 RANDOMIZE USER 0
 OUT 244, 0
 - when you get a [E]
 cursor, press ENTER.
 The computer will
 look at you. Then:
 RANDOMIZE USER 0

(Note: The system will re-initialize after every RANDOMIZE USER 0)

Those with additional questions can write to me
 Mrs Brinsford
 317 Janice Street
 Enderby, WY 13704
 Please enclose a SASE for a reply



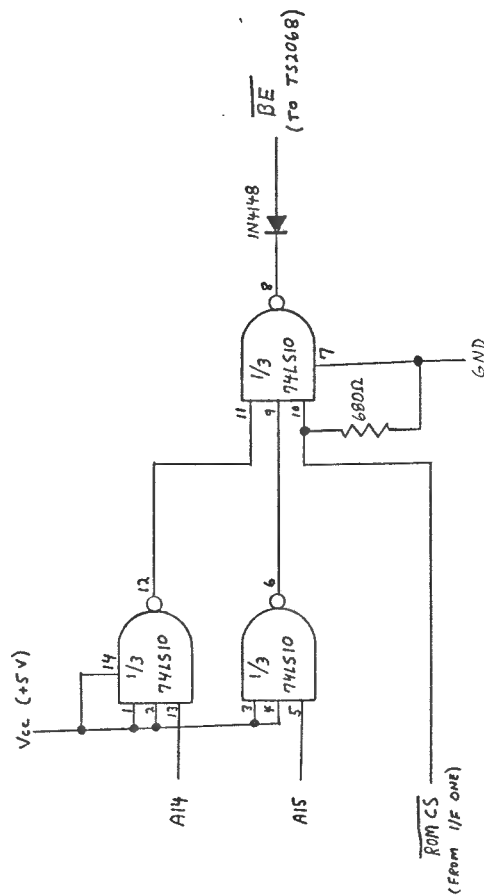
5/85
 Group
 10/8
 10/8
 10/8
 10/8

Our Thanks to:
 Since News
 PO Box 523
 Oswego, N.Y. 13827
 I design and write because I enjoy it. Anyone wishing to contribute and sell this item is free to do so, but I'd appreciate you're sending me one or two of the finished item as a courtesy. Have fun!

Here are John Olinger and Wes Bazarowski's interface schematics. Use whichever chips you have. Note especially that MREQ is not used in decoding BE (bank enable - not) as this would cause timing problems. MREQ goes low in its own good time and works fine that way.

THE JOHN OLIGER CO.
11601 WHIDBEY DR.
CUMBERLAND, IN 46228

SOLUTION TO ROM CONFLICT ON T3068 COMPUTER USED W/ SINCLEAR I/F ONE WORKS WITH EMULATOR, SPECTRUM ROM, OR ROM SWITCH IN ALL POSSIBLE CONFIGURATIONS.

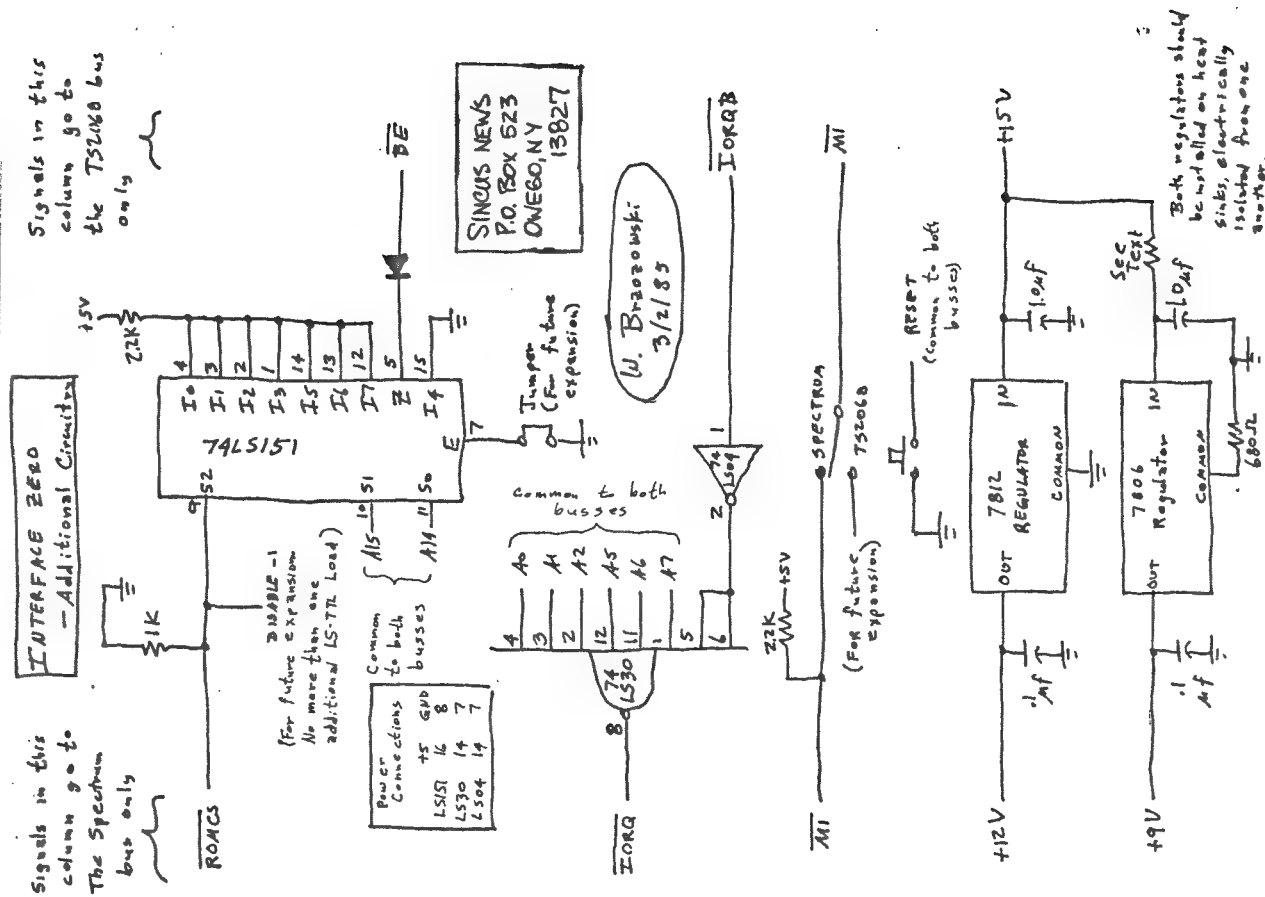

$$\overline{GE} = \overline{A15} \cdot \overline{A14} \cdot \overline{ROMCS}$$

PARTS LIST:

- 1 PC - 74LS10 IC (APPROX. 35¢)
1 PC - 680Ω RESISTOR (5¢)
1 PC - 1N4148 DIODE (5¢)

LICA

The Long Island Computer Association (all computers) meets the 3rd Friday of each month. Call (516)-293-8368 for more info. Or write to LICA Box 71, Hicksville, N.Y. 11802.



15

The Sinclair QL was originally constructed with the UK market in mind. Therefore there is some compatibility difficulties with the QL and US monitors. There are three types of color monitors :

- 1. Composite
- 2. RGB (TTL)
- 3. RGB (analog)

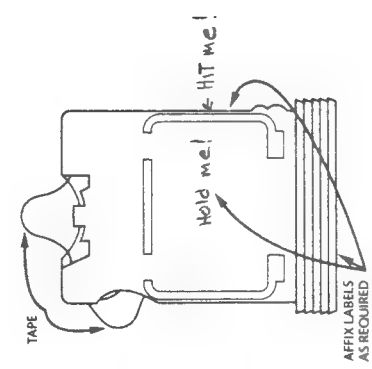
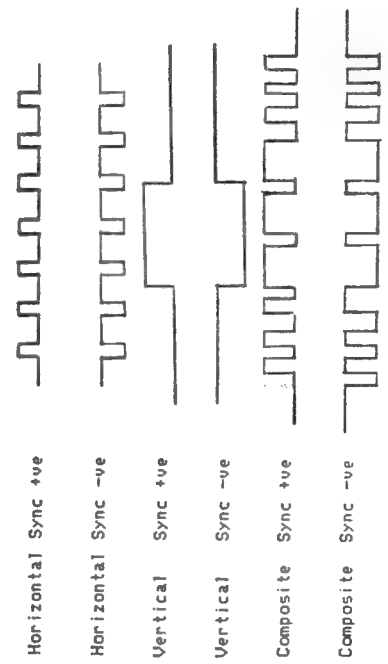
Composite monitors will only work properly on US QLs, by connecting their input to the appropriate pin of the 8-way connector.

RGB (analog) monitors are uncommon in the US and are usually quite expensive. Its possible (though difficult) to interface a QL to them, so they are pretty much worth avoiding.

RGB (TTL) monitors are suitable for the QL, but care must be taken in interfacing them. Here is what you need to do :

- 1. First ensure that the GND, R, G and B lines are wired through.
- 2. Next hook up the SYNC signals. This may require effort, since the QL only provides two of the possible six signals, and different monitors require different combinations. However, it is always possible to generate the correct SYNCs with a suitable extra gate.

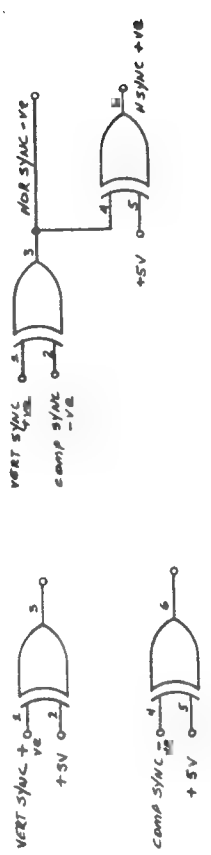
The SYNCs may be as follows :



HINT & TIPS

Tape coming out of the cartridge? Hold it by the top and bottom (the widest part) and lightly tap it on the edge of your desk a few times the tape should slide back in.

The QL only provides Vertical Sync +ve and Composite Sync -ve. You can generate the others as follows :



The XOR gates are from a 74LS86 or similar chip. It is sometimes necessary to put a capacitor on a HSYNC line to deglitch it.

- 3. If the picture is wandering up and down on the screen, try adjusting the vertical hold.
- 4. The only remaining problem should be overscan : The QL uses around 51.2 microseconds of video compared to the more usual 44. This can often be adjusted inside (or occasionally outside) the monitor ; Look for a 40/80 character switch or horiz/vert width controls.

PIN CONFIGURATION FOR QL

Pin	Function	Signal	Color
1	VIDEO	Composite Monochrome Video	Brown
2	GND	Ground	Green
3	-	Power	Orange
4	VSNC	Vertical Sync	Blue
5	CSNC	Composite Sync	Yellow
6	RED	Red	White
7	GREEN	Green	Red
8	BLUE	Blue	Purple

General care

- * NEVER TOUCH THE TAPE WITH YOUR FINGERS, or insert anything into the cartridge.
- * Always store cartridge in its sleeve when not in use.
- * Insert or remove cartridge from Microdrive slowly and carefully.
- * Ensure cartridge is firmly installed before starting Microdrive.
- * Do not repeatedly insert and remove cartridge without running Microdrive

Tape loops

If a loop of tape appears at either of the two places shown in the diagram above, gently ease it back into the cartridge. Use a clean non-fibrous instrument for this - e.g. the side of a pen or pencil. NEVER touch the tape with your fingers, for this or any other reason.

Start-up

On receiving your new blank Microdrive Cartridge we advise you to allow it to run for about 30 seconds before writing data on it. Do this by repeatedly using the FORMAT command (see UserManual). Sinclair Research Ltd, Stanhope Road, Camberley, Surrey, GU15 3PS.

Engineering Chart Sheets

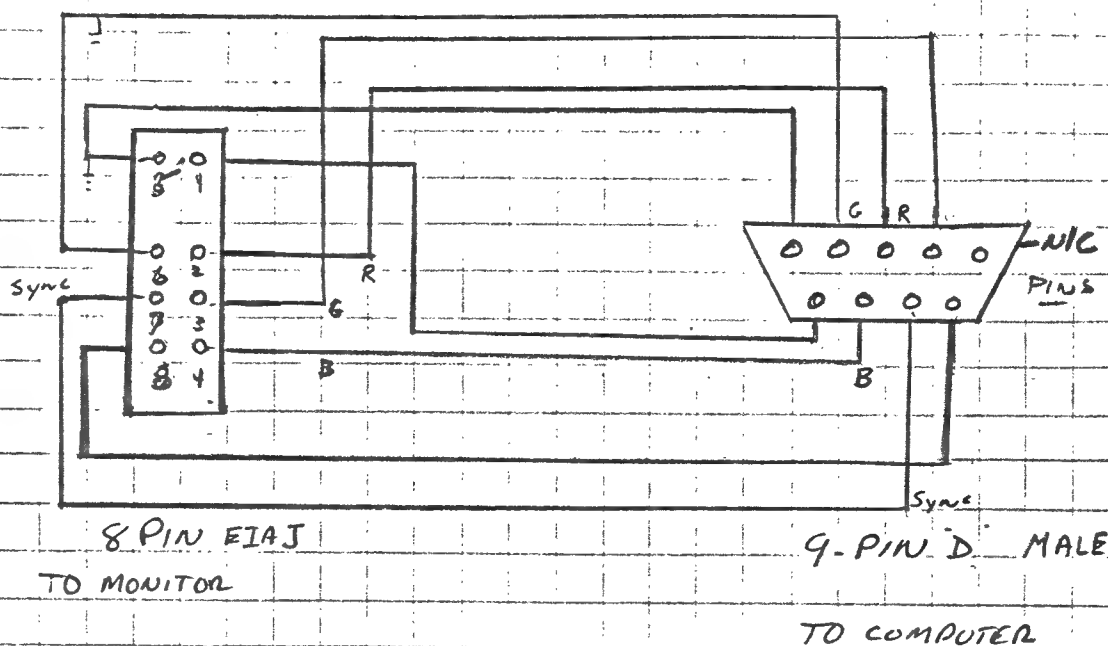
Subject STD. RGB INTERFACE

(IBM FROM EWC)

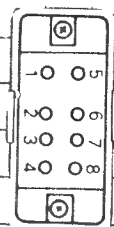
App.

Date 4/1/85

By

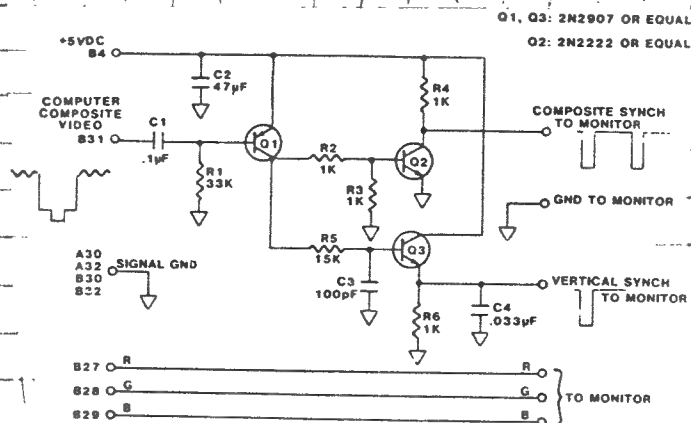
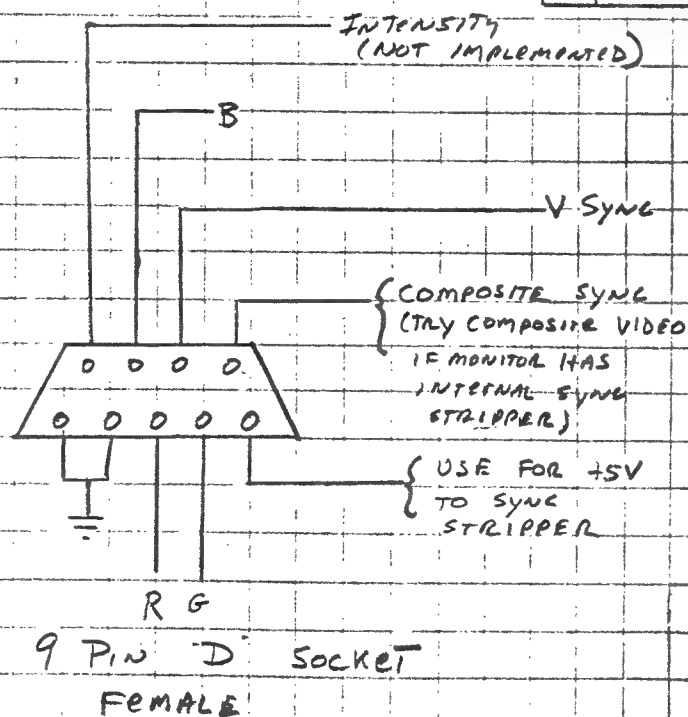


TRANSISTOR NUMBER	PKC- UNIT	PKC- AGE	LEAD INFO	WEB MAX	VCE MAX	WEB MAX	I C MAX	T J MAX	P TOT	F T MIN	C 08	H FE	H BIAS	USE INFR	EUR EQUIV	USA EQUIV
N2222A	NS	T018	L01	75V	40V	6V	800MA	175C	500MF	250M	8P	40/100	150MA	BSG	85F95	2N2222A
N2222A	NS	T018	L01	75V	40V	5V	800MA	175C	500MF	250M	8P	40/100	150MA	BSG	85F95	2N2222A
N2221A	NS	T018	L01	75V	40V	5V	800MA	175C	500MF	250M	8P	40/130	150MA	PAG	56I	85F64
N2222A	NS	T018	L01	75V	40V	5V	800MA	175C	500MF	250M	8P	100MA	150MA	PAG	56I	85F64
N2222A	NS	T018	L01	75V	40V	5V	800MA	175C	500MF	300M	8P	100MA	150MA	PAG	56I	85F64
N20954A	PS	T018	L01	60V	40V	5V	600MA	200C	400MF	200M	8P	40/120	150MA	MEB	85F84	2N2097A
N2927A	PS	T018	L01	60V	40V	5V	600MA	200C	400MF	200M	8P	100MA	150MA	MEB	85F84	2N2927A
N2937A	PS	T018	L01	60V	40V	5V	600MA	200C	400MF	200M	8P	100MA	150MA	MEB	85F84	2N2937A



PIN CONNECTION TABLE

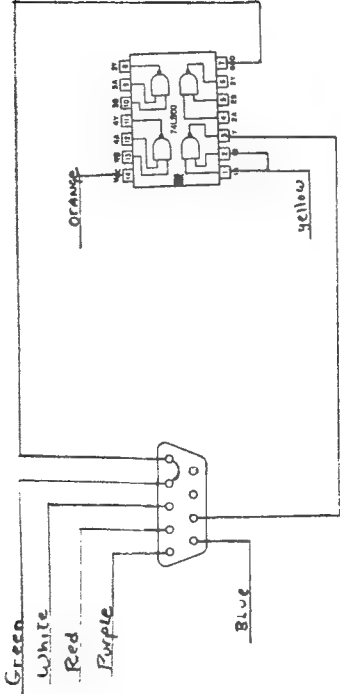
- | | |
|-------|--|
| PIN 1 | Intensity Input |
| PIN 2 | Red Input |
| PIN 3 | Green Input |
| PIN 4 | Blue Input |
| PIN 5 | Ground |
| PIN 6 | Ground |
| PIN 7 | Vert/ Horiz Composite
or Horiz Sync Input |
| PIN 8 | Vert Sync Input |



Take Special Note: Q3 appears to be backward here.

(FROM OUTSIDE)

ON COMPUTER (DIY INSTALLATION)



monitor

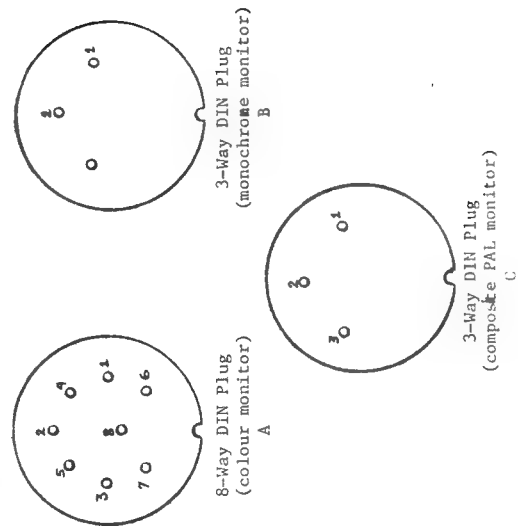
A colour monitor can be connected to the OL via the RGB socket on the back of the computer. Connection is via an 8-way DIN plug connected to the OL and a suitable plug at the other end

pin	function	signal
1	VIDEO	composite monochrome video (3)
2	GND	ground
3	PAL	orange
4	VSNC	vertical sync
5	CSYNC	composite sync
6	RED	red
7	GREEN	green
8	BLUE	blue

(1) 0-5V TTL compatible (active high)
(2) 0-5V TTL compatible (active low)
(3) 1V pk-pk into 75 ohms
(4) May work with the composite video input on some VCRs

A monochrome monitor can be connected using a screened lead with a 3 way or an 8-way DIN plug at the OL end. The connection at the monitor end will vary according to the monitor but is usually a phono plug. The monitor must have a 75 ohm 1V pk-pk composite video non inverting input (which is the industry standard). Both 3-way DIN plugs and phono plugs are commonly available from audio shops.

An RGB (colour) monitor can be connected using a lead with an 8-way DIN plug at the OL end. The connection at the monitor end will vary according to the monitor (there is no industry standard) and will often be supplied with it. A suitable cable with an 8-way DIN plug is available from Sinclair Research Limited



Note : The Princeton Graphics HC-12 Generates :

- 1. Horizontal Sync +ve
- 2. Vertical Sync +ve

MONOCHROME MONITORS

Monochrome monitors can be connected by :

- 1. Soldering the central core of the video input cable to the Brown lead of the 8-way connector.
- 2. Soldering the outer core of the video input cable to the Green lead of the 8-way Connector.

Video audio—Many TVs have an annoying speaker buzz even when the sound is turned to its lowest setting. If you're using such a TV for a monitor, just plug a headphone into its headphone jack, and the buzz should disappear. Sometimes you can use just a plug, with nothing connected, and achieve the same effect.

Fred Lacey
Corvallis, OR

104 / RUN MAY 1985

USING THE HUNTER NVRAM * BOARD

USING THE HUNTER NVRAM BOARD

If you've bought and built Paul Hunter's NVRAM board, but are having some trouble moving your basic programs down into the 8-16K areas here is a little BASIC loader to set up the transfer program.

```

1  REM XXXX This serves no function yet - make sure it has about 60 or 70 X's.
9  REM now we set up a numeric variable N
10 DIM N (45)
15 Print "ENTER THE NUMBERS TO BE POKED, WHEN PROMPTED"
20 For I = 1 to 45
25 REM Enter in the numbers from Hunter's table starting with 17 and ending with the 201 which
   goes at 8289
30 Print "Memory Location"; 8243 + I; " will contain:";
40 Input N(I)
50 Print N(I)
60 Next I
70 Stop
100 REM now check your results
105 Print "I "; "I+8243"; "Contents"
110 For I = 1 to 45
120 Print I; " "; I+8243; " "; N(I)
130
140 Print "If Some of These Are wrong, then correct them as direct statements. E.g., By
   entering LET N(12)=33, if the code which was to go at location 8255 was not correct, etc."
190 STOP

200 REM now we do the actual Poking
210 For I = 8244 to 8289
210 Poke I, N(I-8243)
220 Next I
290 Stop
300 REM now new this Program out of existence
310 REM LOAD in your program (less than 6K, I hope)
320 REM and do A Rand USR 8244
330 REM A copy of your program will now reside
340 REM at location 9003 on your Hunter Board,
350 REM to Get it back, enter Rand USR 8269

```

Enter the program as listed and then RUN it (only run this program once, unless you want to start over completely). You will enter the 45 machine code numbers given in Paul's documentation for the board. The program will then list the numbers you typed in and the memory locations to which they will soon be POKE'd. To do this, GOTO 100. If some of the bytes are wrong you can change them by either re-running the program (to do them all over) or use a LET command as described in line 140.

Assuming all the values are correct, GOTO 300. The machine code necessary to transfer an entire BASIC program down to NVRAM and back again is now located in the NVRAM itself. Specifically, the transfer down routine begins at 8244 and the transfer back up routine begins at 8269. Your program itself will be put at location 9002 and those following.

The "power" command being used here is the LDIR at either 8266 (to transfer down) or 8287 (to come back). This machine language command transfers as many bytes as you want (e.g., length of program), from one part of memory (the BASIC area starting at 16509) to another (in this case from 9000 on).

Do note that the Real BASIC area and RAMPACK must be used to RUN a program, that is, you must move the program back to 16509 ff to use it. Also, and I had hoped most users realized this; the NVRAM occupies the space from 8-16K, thus, it is a maximum of 8K long. We're using up the area from 8192 to 9000 for these and other routines. Therefore, the longest BASIC program, including saved variables, which can be placed in NVRAM is 16384 - 9000 or about 7300 bytes. So, if you have a program that is truly 16K - it just won't fit. If your program is just a little too long, you can try compression techniques (e.g., delete all REMs, use variables (N=PI/PI for 1, etc, for numeric data) on your program before transferring it down.

HOW IT WORKS

Given that you've entered our program and Paul's data correctly, the transfer code is ready and waiting down in the 8-9K area. To actually do your transfer do this:

- 1 LOAD the program you want to keep in NVRAM.
- 2 In the immediate mode, Peek 16404 + 256 * (PEEK 16405). This is E-Line, the end of the variable area. If this is greater than (16509 + 7300) 23800, or so, you have a problem and must reduce the size of the program or eliminate the variables.
- 3 Assuming your program is less than 7300 bytes long, now enter RAND USR 8244. A copy of your program now resides in NVRAM.
- 4 NEW your machine.
- 5 Now for the acid test. Press enter. No program there, right? Good! Now key in RAND USR 8269, and if all went well, your program is now back in the user area (16-32K) ready to run.

- 6 If you modify data, remember to SAVE a tape copy and transfer the new version down to NVRAM as in step 2 and 3 above. It will simply overwrite the old version.

Oh yes! I've lent my Hunter Board to NAZIR for his bank switching experiments. This means I haven't been able to actually use the loader program. I normally wouldn't print a routine which I haven't personally verified, but, as demand for these notes was urgent, here it is anyway.

* NVRAM MEANS NON-VOLATILE RANDOM ACCESS MEMORY

Address	Data	Mnemonic
8244	17 125 64	LD DE (start of program area, 16509)
8247	42 12 64	LD HL (start of display file)
8250	183	OR A (clear carry flag)
8251	237 82	SBC HL, DE
8253	68 77	LD B, H and LD C, L
8255	33 40 35	LD HL (start of storage area, 9000)
8258	113	LD (HL), C
8259	35	INC HL
8260	112	LD (HL), B
8261	35	INC HL
8262	54 118	LD (HL), (code 118)
8264	35	INC HL
8265	235	EX DE, HL
8266	237 176	LDIR
8268	201	RETURN

Address	Data	Mnemonic
8269	237 75 40 35	LD BC (size of program)
8273	42 12 64	LD HL (start of display file)
8276	43	DEC HL
8277	197 229	PUSH BC; PUSH HL
8279	205 158 9	CALL routine at 2462 decimal
8282	209 193	POP DE; POP BC (note exchange)
8284	33 42 35	LD HL (start of storage area; 9002)
8287	237 176	LDIR
8289	201	RETURN

Radio Electronics - Aug. '83

2K-8K Pokes & Calls

Use at your own risk!

Rand USR 0	clears program & restarts
Rand USR 681	In FAST mode, prevents report code from display
Rand USR 757	In FAST mode saves a program without a name
Rand USR 836	In FAST mode, will load a program and STOP it even if it is self starting. Gives a C error code but disregard. Hit LIST and there is the program. Some MC programs initialize from the print buffer and you may not get a listing. I have seen only 1 program that did this (HOT Z-I) Most start with a RAND USR 16514.
Rand USR 930	Equivalent to BREAK
Rand USR 963	clears program area & variables (NEW)
Rand USR 2955	equivalent to ";" in a print statement
Rand USR 3086	scrolls up one line
Rand USR 3292	Equivalent to STOP
Rand USR 3875	Equivalent to FAST
Rand USR 3883	Equivalent to SLOW
Poke 16418, 0	Makes a 24 line display (don't scroll or input = CRASH)
Poke 16441, 20	Gives a 34 column display (careful, can cause CRASHES)
Poke 16509, N	N = 40 to 63. Makes editing hard; line # have letters N=99 prevents program from running or listing, poke to 0 to restore operation.
Poke 16510, 0	Makes first line number 0, can't be edited. Use for Copyright notice. To hide listing use the following
Enter "1 REM aa", then POKE 16514, 118 & POKE 16515, 118. Listing is gone	

Capt Anthony J. Oresteen

5679-B Brett Dr, FT Knox, KY 40121 (502) 942-1326

Screen\$-TS1000

Is that TS1000 gathering dust in the closet? Drag it out and type in this short routine, I guarantee it will perk you right up.

It is a short MC routine I wrote to emulate the 2068 screen\$ command. It saves a complete display file in a string of your choice, ready to recall with a simple print string command from basic. Just observe these few rules for it's use: 1. Dim your string(s) as the first program lines e.g. Dim A\$(704) 2. Poke the code of your string letter into 16417. You can find the code of the letter by entering a print code "_" in the immediate mode. 3. Call the screen\$ routine to store from within your basic program and before any full screen error reports appear (error 5). Please note that the command can not be used from the immediate mode.

I have used the program to print menus for utility programs as well as covers for game programs. The advantages of screen\$ are the relatively fast rate of retrieval, the potential to store 20 or more screens in 16K, and the ability to design a screen with a drawing utility program and save it.

First create a rem statement with 49 or more spaces. Then enter lines 10 through 200 of listing 1. Enter the code from left to right. When you are done and the sumcheck is verified to be 4680, delete lines 10 through 200.

An example program is given in listing two.

CEM BARUT

LISTING 1

```

1 REM 12345678901234567890123
456789012345678901234567890
10 FOR I=16514 TO 16562
20 INPUT A
30 POKE I,A
40 SCROLL
50 PRINT I;" ";A
60 NEXT I
95 SCROLL
70 PRINT "DONE"
75 SCROLL
100 REM SUMCHECK SHOULD BE #4680
0*
120 PRINT "PRESS A KEY BEGIN SU
MCHECK"
130 IF INKEY#="" THEN GOTO 130
140 FAST
150 LET SUM=0
160 FOR I=16514 TO 16562
165 LET Z=PEEK I
170 LET SUM=SUM+Z
180 NEXT I
190 SLOW
200 PRINT SUM

```

LISTING 2

```

1 REM USRNDLEN ZE=RND GOSUB ?
(RND GOSUB ???E(RND GOSUB ?)
OSUB ? FOR EE=RND7=-VAL #47 FOR ?
FOR 7<< SAVE 7AT ( LET TAN 0
10 DIM A$(704)
20 POKE 16417,38
30 FOR I=1 TO 100
40 PRINT "X";
50 NEXT I
60 RAND USR 16514
70 CLS
80 PRINT A$

```

```

58 33 64 198 160 42
20 64 237 91 16 64
237 82 68 77 42 16
64 237 177 1 5 0
237 74 235 42 12 64
35 6 22 197 6 32
78 235 113 235 35 19
16 248 35 193 16 241
201

```

ADDR	HEXCODE	NAME	MNEMONIC
4082	3A2140		LD A,(4021)
4085	06A0		ADD A,A0
4087	2A1440		LD HL,(4014)
408A	ED5B1040		LD DE,(4010)
408E	ED52		SBC HL,DE
4090	44		LD B,H
4091	4D		LD C,L
4092	2A1040		LD HL,(4010)
4095	EDB1		OPR
4097	010500		LD BC,0005
409A	ED4A		ADC HL,BC
409C	EB		EX DE,HL
409D	2A0C40		LD HL,(400C)
40A0	2C		INC HL
40A1	0B15		LD B,15
40A3	05		PUSH BC
40A4	0520		LD B,20
40A6	4E		LD C,(HL)
40A7	EB		EX DE,HL
40A8	71		LD (HL),C
40A9	EB		EX DE,HL
40AA	23		INC HL
40AB	13		INC DE
40AC	10F8		DJNZ 40A6
40AE	23		INC HL
40AF	01		POP BC
40B0	10F1		DJNZ 40A3
40B2	09		RET

Bob Dyl recommends "stretching" your micro drive cartridge. His group feels that they've gained at least 1 or 2K per cartridge by using the following program:

```
10 For I = 1 to 10
20 Format "m";1;"Test"
30 Next I
40 Cat 1
```

We tested Bob Byl's program for microdrive cartridges "stretching" and found the following:

	FORMAT FIRST	MIN FORMAT	MAX FORMAT	FINAL
a	11*	89	89	89
b	89	89	89	89
c	90	89	90	90
d	88	87	88	88
e	89	88	89	88
f	85	85	86	86
g	88	87	88	88
h	87	87	87	87
i	89	88	89	89
k	90	90	91	91

* On Start up (assume 89)

So of 10 tapes the average (true) starting number of free bytes was 88.4. After repeated formatting we got an average of 88.5 although I found that manually FORMATTING and CAT-aloging allowed me to stop the process at a high level. A typical stream of results was:

FORMATTED	1
1 time	89
2 times	88
3	89
4	88
5	89
6	88
7	89
8	88
9	89
10	88
Manually	89 STOP.

My conclusion, with a lot of time on your hands and wear and tear on the microdrive, you might be able to to eek out 1K more from most cartridges.

Comments from Costa Rica - Jess Peeler
Report on Damaged/Surplus TS-1000 Computers

I have seen 2 sources for these damaged/surplus computers:

- (1) Zebra Systems, Inc.
- (2) American Surplus Trading - on p. 31, Radio Electronics, Dec '84

In 1984 I purchased a dozen of these surplus computers from Zebra Systems. They are sold on an as-is basis and all have one or more defects. Additionally, since only the computer is sold, one must provide power supply, cables, and T.V. interface adapter. Nevertheless, I consider them, at \$10 apiece, the bargain of the century.**

Now, to what was found in the dozen orphans which I had acquired.

My conjecture is that they were bought by the carload for a dollar or so per unit and were either Timex factory rejects or customer-returned computers which were found to have failed.

First thing noted was that all units had Timex 1000 identification completely removed - from both the top and bottom of the case. (Timex was ashamed?)

Mechanically, only 1 of 12 had suffered slight damage - in that the small screws holding the 2 case halves together were stripped out of the plastic stand-off supports.

Electronic problems:

- (a) 2 of the 12 had burned out Sinclair SCL chips - the special Ferranti "Sinclair Computer Logic" chip manufactured for Sinclair. This chip is still available (I believe) from Sinclair Research Limited, 4 Sinclair Plaza, Nashua, N.H. 03061 - at \$12.00 apiece. (Ask for IC-1, ULA Custom Chip)
- (b) 1 of 12 had a burned out Z-80A chip. This chip is available from dozens of suppliers for as low as \$2.50 each.

Electrical/Mechanical problems -

- 11 of the 12 units had suffered damage to the delicate plastic finger connections from the keyboard - as noted in a previous write up.

Final Count - of my dozen orphans, by carefully trimming the keyboard plastic finger connections and replacing one Z-80A chip, my net gain was 10 working computers and 2 available for spare parts. I could also, by purchasing the ULA Custom chip from Sinclair, restore the last 2 to working order. Therefore, for the computers alone, total parts comes to 12 x \$10 + \$2.50 (for Z-80A) + 2 x \$12 (for ULA) = \$146.50, or an average of \$12.21 apiece. Add \$5 to \$20 for the D.C. power supplies, connecting cables and T.V. switch/interface (depending on luck and skill in purchasing) and you're looking at a batch of TS-1000s for under \$35 apiece.

** My thinking is based on using the TS-1000 as a beginner's computer, as a simple business machine, and for those satisfied with black and white and no sound.

FOLLOWUP:

A & J MICRODRIVE:

Jeff Street reports that you can have more than 9 programs on a wafer. Files can be named with a single number (1-9 in the manual) all right, but you can also use the characters whose ASCII code is greater than 9, as well. See your 2068 manual.

CREDIT WHERE CREDIT IS DUE: Paul Bingham drew the sketch of the A&J unit which appeared with the article.

MEA CULPA:

In our previous listing we may have left out a good publication:
SUM
3224 Northeast 30th Avenue
Gainesville, Fl. 32605

Subscriptions are \$12.00/yr. Joe Williamson has designed a "universal" Centronics interface for the 2068. It works with both Aerco and Tasman and requires no POKES. You can contact the Gainesville User Group through them too.

THE NOS-BASICODE 2 PROTOCOL

Marty Jeskin has just obtained the BASICODE-2 package from Radio Netherlands. It comes with a translation for most popular home micros (e.g., CP/M, Apple II, Spectrum, ZX81 (new) Commodore, TRS-80, etc.) on one side and a pastiche of "universal" programs which will run on any of these machines, or the other.

Once the translator is loaded, you tune in Radio Netherlands' "Hobbyscoop" program on by your shortwave and download a Basicode program, from the air. A few minutes of machine code juggling and up pops a runnable version for your system.

We haven't gotten the "off the air" version working yet, but it looks like a very interesting idea. More details (frequency, times, quality of software, etc.) next issue and at the June meeting.

This book and the accompanying cassette contain the details of BASICODE. It has been designed as a standard for software exchange between over 20 different brands of computers. These include some of the most popular brands being used by computer hobbyists in many different parts of the world. This third edition of the handbook contains some recent additions to the BASICODE family, such as the Sinclair ZX81 and Spectrum computers. Some of the chapters in the second edition of this book, dealing with OSI, Exidy, DAI, and PET 2001 have been removed in this third edition as the computers have not been on the market for some time now. However, the BASICODE translation programs still exist for these computers via the user groups listed in the final chapter.

The cassette contains the various "translation" programs, each specific to a particular brand of computer. In simple terms, you first "teach" your computer the BASICODE standard by loading the translation program. Then you can read and write, using the standard, with the other 16 brands of computer. Instructions on how to do this are contained in the following chapters.

Klaas Robers, who is a well-known inventive radio amateur in the Netherlands, then came up with an interesting proposal. This involved the creation of the type of "Computer Esperanto" which could be "read" and "written" by various home computers. A group of computing hobbyists was thus formed and the so-called "BASICODE" was the result of many months of research.

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2068 REPAIRS:

Timex has apparently stopped out of warranty service & turned same over to:

T/S Connection
3832 Waterson Avenue
Cincinnati, Oh 45227

Talk to Jack Roberts (513) 271-5575
Cost to repairs is reported to be higher (\$30-40), T/S Connection may also be a source for parts.

Bob Dyl (English Micro Connection) says that, at a recent computer fair in the U.K., a giant billboard was constantly updated to show the total number of current Spectrum Software titles. He reports, that new releases had pushed the total to 5403 while he was there.

Translation programs

1. Apple II & Iie.
2. BBC LOAD
3. BBC SAVE
4. Colour Genie
5. Commodore 3000, 4000, & 8000
6. Commodore 64
7. VIC-20 LOAD
8. VIC-20 SAVE
9. Exidy Sorcerer
10. Microprofessor
11. New Brain LOAD
12. New Brain SAVE
13. Philips P2000
14. Sharp MZ-80A, MZ-80B, MZ-80K
15. 48K Sinclair Spectrum LOAD
16. 48K Sinclair Spectrum SAVE
17. Sinclair ZX-81 LOAD
18. Tandy TRS-80/Video Genie/Compatibles LOAD
19. Tandy TRS-80/Video Genie/Compatibles DIS-PLAY
20. Tandy TRS-80/Video Genie/Compatibles SAVE

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New Peripherals

P.

23

(A PREVIEW) THE TC2068 AND THE TIMEX PORTUGAL DISK DRIVES

BY N.A. PASHTOON

Acknowledgement: I would like to thank ZEBRA SYSTEMS for supplying me with a preproduction unit of TC2068 and the disk drives for this preview.

NOTE: As you may have noticed this article is a product preview. The units that I received were accompanied by a xerox copy of the TS2068 Users Manual and a User Manual for the Floppy Disk Drive System which was intended for Spectrum users. In other words there was no technical information supplied on the system hardware. My objective was to make the disk drives work with our computer i.e. TS2068. As such I had to do some amount of tracing inside the computer in order to identify the bus. Since computer board circuit tracing under the best of circumstances is a tedious job, and the circumstances under which we TS users operate (midnight shifts) are far from ideal, I can't guarantee 100% accuracy for the information presented herein. This article was prepared in the hope of presenting technical information in a timely fashion to TS users. Since I did not have sufficient time to put the system through its paces, and do justice to what I think is an excellent product, I would refrain from giving you information on the speeds of the drives (they are fast!). The first review will probably appear in SUM. We here at LIST are hoping to provide you with a comparative review of possibly four disk drive systems in the near future. Oh yes! the \$64000 question that each one of you in TS Land want to ask first whether the drives work with the TS2068 or not? The answer is YES! TIMEX PORTUGAL'S DISK DRIVES WORK BEAUTIFULLY WITH THE TS2068 AND WITHOUT AN EMULATOR !

BACKGROUND: Some of you may be wondering what TIMEX-PORTUGAL is all about? It seems when TIMEX-USA closed its computer division the Portugese Government took over their factory and operations in Portugal with the intent of continuing the production of the TS2068 for the Portugese market. At the time of this writing TIMEX-P has also set up headquarters for U.S. operations in Connecticut. Rumors are that the computer and the drives have passed FCC or that it is in the final stages of the FCC clearance. The present quotations for the price of the TC2068 computer and the disk drive system are \$159.00 and \$239.00 ; respectively, from The British Microconnection. We also hear the rumors that TIMEX-P considers these prices as only *10-20% only* have an emulator with it). My reaction to these happenings, and I am sure I am reflecting the feelings of many TS users, is a sigh of relief after a whole year of bad news.

It is worth mentioning that beside TIMEX-P's effort to market the product in U.S., a giant multinational corporation is also putting an effort to help TIMEX-P in this venture. So, Welcome TIMEX-Portugal and Best Wishes. We also hear that the sales of the computer in the Portugese market are now in five digits.

IT MIGHT HAVE BEEN MEANT TO

The TC2068

What is a TC2068? When you open the box , the silver gray computer looks exactly like your TS2068. The cartridge port ,

the joy stick ports , the connectors in the back , the on/off switch . You have this immense urge to plug in all your TS2068 hardware to the back of the computer and then turn it on. DON'T! So let us turn on the computer without any peripherals. On the screen you see the usual Sinclair and Timex copy right messages. You load in a few TS2068 programs , they load fine and work as on TS2068. You become bolder , keeping your fingers crossed, and insert a game cartridge , with one finger on the off/on switch, and discover it works. Finally you load a program like MUSICOLA which was specifically written for TS2068 , using the sound chip, and you discover it works nicely. You also discover that the sound coming out of the machine is much louder than your TS2068, your kid is loving it. You say to yourself , that if the TS2068 was so loud it will have driven you bannanas, and would have resulted in either you leaving home , or the kid being thrown out , or may be you quitting your hobby! Now on the serious side , the sound is louder and pleasant. Probably some of you might find it objectionable , in which case the installation of a volume control should not present a problem.

To check for various video modes you start testing the machine again with software specifically written for TS2068 , and using these extended modes. You load in Zebra Painter and Tech Draw , the machine handles them fine. You reach the conclusion that TC2068 is supporting all the extended modes.

The final test the TC2068 has to pass is to run software that switches banks. So you put the AROS version cartridge of Ray Kingsley's excellent assembler-disassembler in the cartridge slot , Lo! and behold! it works fine. The banks are switched properly .(Ray: take note). You become curious , and start a disassembly of Home ROM , all major routines and their entry points are the same. You check the version of Home ROM , that is the same. Finally you prepare a disassembly of the EXROM , and you discover all the jump tables and code is the same (warts and all). The only conclusion you reach is that this is the good ol' TS2068 . You finally insert Doug Dewey's EMU-1 Spectrum Emulator and discover that it works. You test it with your regular repertoire of games and software and discover that all of them work as on TS2068. Lastly you start testing interrupt driven (IM 2 Mode) software, and find out that they don't work. As I said before the only conclusion you can reach , as far as software is concerned , is that TC2068 and TS2068 are the same . TIMEX-P has not incorporated the easy solution for correcting the problem of running interrupt driven Spectrum software on their machine.

The display on my monitor was not of good quality. The reason for that became obvious upon opening the machine. I found that the crystal had been changed and there exists extraneous circuitry near the modulator , which has been an attempt in this country to adapt the machine to NTSC video standards. Since this is a preproduction sample I don't have any complaints here. For that matter on the machine I am testing I could not save anything on the cassette, which probably is due to bad solder connection or component. The unit runs from a power pack which supplies 9 volts to the computer. The power pack rating is for 220 volts, but again some body had modified it for 117 volts operation. The 117 volts rating was on there written by a marker pen on the case of the power pack.

THE TC2068 CIRCUIT BOARD: When you open the case you discover a different lay out than TS2068. The IC layout of the printed circuit board is shown in Fig.1. I took the liberty of numbering the IC's based on the numbering in TS2068 manual, rather than using the identification numbers used by TIMEX-P. For example in TS2068 the SCLD chip is numbered U3. TIMEX-P has designated the similar chip as U2.

Beside the layout difference, one also notices a clean high quality production without a single wire on the top of the board. If you study the layout diagram you will notice that certain of the chips which were used on the TS2068 are gone. The SCLD chip is now a PAL (Programmed Array Logic), and has a different number, even though the manufacturer is still NCR. (This is bad news for TS2068 users). Later I discovered that the pinout on the PAL is different than the SCLD. Gone is also the small board in TS2068 which had the 74LS00 for bankswitching. This function is probably incorporated in the PAL design. More importantly the 74LS245 in TS2068 which was used for buffering the three most significant address lines and RD, WR, MREQ, RFSH, and IORQ is gone. This should give us a clue as to the future planning of TIMEX-P. Namely; the ambitious plans of TIMEX-USA for the BEU (Bank Expansion Unit) are probably thrown out (I hope I am wrong!). On my unit all the RAM chips have power supply bypass capacitors piggy-backed to the chips. This just proves that designers and members of design teams are human beings, and can make such an obvious mistake.

The video circuits area is cleaned up substantially. As you have noticed, a modern chip, namely, the MC1377 has been utilized. The MC1377 converts RGB to PAL or NTSC standards video. Gone is also the switching regulator chip 7805, and I guess some transistor and Zener diode circuitry has replaced it. Gone is also the series regulator transistor, 2N4301, and its associated circuitry. Instead a 7805 regulator, with a chunky and large aluminum heat sink, is used. The heat sink is large enough to cover the top of the bus expansion connector.

The back of the board is also clean, except a whole bunch of bypass capacitors, which were added later. (Some body forgot!). There are a few wires and diodes soldered, which obviously was an afterthought, in order to make the microdrives work with the computer. An explanation of the circuitry is provided in another article in this issue titled "The Final Twists of The Twistor".

In Fig.1 a diagram of the bus is shown. It took a good amount of circuit tracing to obtain the information. The important feature of the bus is that it is compatible with the Spectrum bus. All the 2068-specific signals are placed outside the 28 pin range of the Spectrum bus. This just proves that TIMEX-Portugal has some clear headed people, who can make sensible decisions. Notice also that the bus provides the RGB video signals outside the range of the Spectrum bus and more interestingly the video SYNCH signal. I did not test this feature yet, but I assume the composite SYNCH is provided.

When it was found out that the bus was a Spectrum-like bus, it was time to put the emulator in the machine. Using a D'ktronics bus extender cable, I connected the Interface 1 and the Microdrives directly to the machine. The microdrives worked flawlessly and without any hesitation.

A question arises as to whether the TC2068 is the best of the two worlds of Spectrum and TS2068? The answer for a general TS user is a definite YES! If you were to buy a TS2068 today and equip it with an emulator and a TWISTOR (Spectrum bus adaptor), and a synch stripper circuit for the RGB, it will cost you far more than the quoted \$159.00 price for the TC2068. So if you are in the market for a Timex computer I strongly urge you to buy the TC2068. The answer to the above question for a minority of TS users (hardware hackers) is a qualified yes. The qualification comes in because I think in the TC2068 the capability of using 256 banks is suppressed (Let us hope I am wrong). As an example the ROSCS signal even though available on the DOCK bus is not brought out to the back, to the edge connector. Another example is the BE signal on the DOCK connector. The signal is brought within 0.5 mm of its respective pin but the connection is not finished. But even when these "shortcomings" are borne in mind the computer is still a best buy!

THE DISK DRIVES

The basic disk system for the TC2068 constitutes of one 3.5" drive, a power supply (capable of driving two drives), a disk controller, and an interface which connects to the edge connector on the back of the computer. The system uses double sided 3.5" diskettes, and provides a storage capacity of 160 kB/side. The sector size is 1024 bytes. The RAM overhead, required by other disk operating systems, is zero for the TIMEX Operating System (TOS). The system has its own RAM which it uses for housekeeping purposes. Two hardware based RS232 serial ports are provided on the Controller unit.

The disk drive, controller, and the power supply are smartly packaged in separate boxes with styrofoam protection. All of these units are housed in silver gray boxes measuring 7 cm(H) by 12 cm(W) by 16 cm(D). They perfectly match the silver gray of the 2068. It will guaranteed win the approval of the person in your household who is responsible for the household decor and was complaining about the hodge-podge of mismatched peripherals of your TS2068. A perspective drawing of the system is shown in Fig.2.

The Interface unit seems to be a personality module. TIMEX-P is promising to supply the Interface units for Spectrum, TC2068, and TS2068. The size of the unit is 3 cm(H) by 9 cm(W) by 7.5 cm(D). It has a female edge connector (Spectrum width) which connects to the edge connector. Unfortunately, the bus is not feedthrough. There is a DB-15 connector on the back, which connects it to the Controller box with a thick and stiff coiled cable. There is a RESET switch on the unit which resets the computer (a welcome addition).

The system was accompanied by a manual titled "FLOPPY DISK DRIVE SYSTEM- USER MANUAL FOR SPECTRUM USERS". It is an excellently written manual. Every single disk command is illustrated with a full fledged session on the system. It shows step-by-step what you type in on the keyboard, and what the computer response will be. It has six chapters and six appendices. By the way, the disk operating system is called TOS (TIMEX Operating System). It is worth mentioning that in my manual (p.4, Chap.2) when the unpacking and setting up procedure is explained there is an error. The sentence concerning the connection of the ribbon cable from the controller reads "There is a white mark on the ribbon plug pointing upwards, placing the red edge of the cable on your left....". On my unit when the white mark is pointing upwards ^{and} the red edge is oriented to the right the units work properly. Please take note!

In operation the system is extremely easy to use. A first time user will be able to make the system start running after installing the system, and flipping through the manual. The ease of use is achieved by TOS using commands which all TS2068 users are familiar with. So for example, instead of say SAVE or LOAD, you just add an asterisk i.e. SAVE * and LOAD *, etc. The same goes for commands like CAT which is CAT*, or FORMAT which is FORMAT*. In other words the system is easier in use than the Microdrives, and will not intimidate beginners. For advanced users the system is a treat. It supports a full blown hierarchic tree structure for directories with roots and branches.

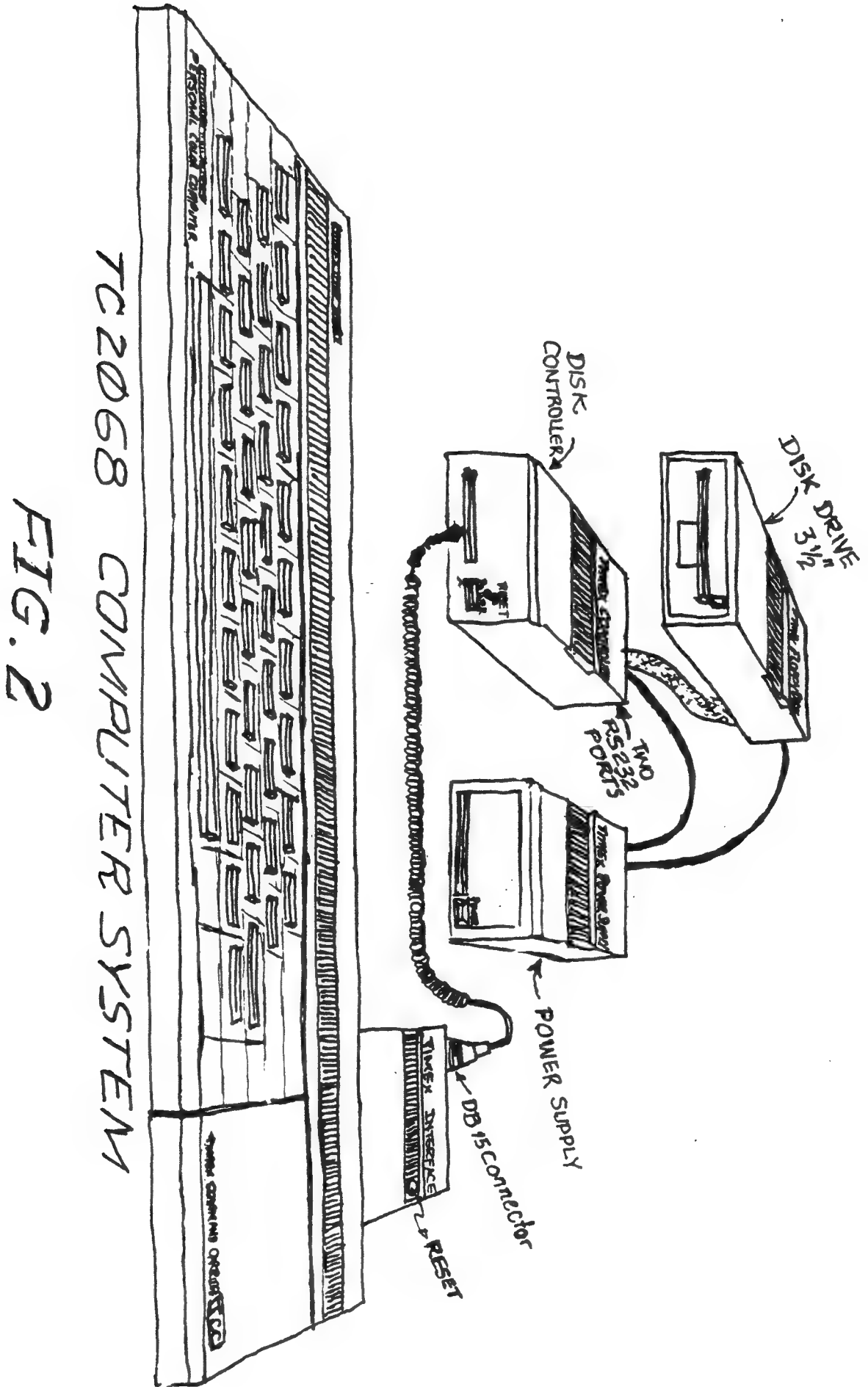


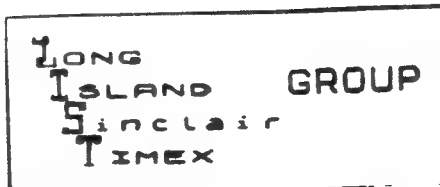
FIG. 2

The Interface unit connects to the Controller box by a coiled cable. When attempting to open the Controller box, I noticed a curious note: "DO NOT OPEN UNLESS YOU ARE A CP/M USER"! After seeing that note I said to myself that even though I am a mortal TIMEX user, I am going to commit the sin, and open the box. First I went to my closet and took out the bug sniffer, just to make sure that the Big Brother was not watching. After being certain, another thought came to mind: May be the darned box has intelligence and can tell CP/M and non-CP/M users apart. What if there are explosive charges inside!! (So I am paranoid, What else is new?) I decided to send the wife and the kid on an errand and with trepidation took the screw driver and slowly opened the box. I can't describe the immense pleasure and the feeling of well being I got from this transcendental experience. Now my goal in life is to join the fraternity of CP/M users, and leave you mortal lower class TS users

Now seriously, the controller has a SGS-ATES Z80 processor, a Western Digital WD1770 disk controller, a WD2123PL UART (Univ. Asynchronous Receiver and Transmitter), a 2716 EPROM, eight 4116 RAM chips, a Ferranti IH035E ULA, assorted registers and buffers, and one chip with the top scrubbed off. The two RS232 ports are on the back of the unit with DB-9 male connectors. On the front of the unit is a controller RESET switch.. Also TIMEX-Portugal's future planning can be surmised from the mention of CP/M on the box. It is very possible that the proper EPROMs are either already available, or they might be in the releasing stage.

Finally the power supply unit, which supplies the power to the Interface, the Controller, and the Drive. It has the capability to power one extra disk drive. It supplies the +12, -12, and the +5 volts required by the system. The controller can handle four disk drives, which will necessitate getting a second power supply.

So much for the description of the system. I found the quality of construction on these units of highest quality. It is pleasing to note finalized boards without jumper wires and components all over the place. The majority of the components used in the manufacture are of European origin. None of the boards have any designation giving a clue of the country of origin for the PC boards. Overall I found the drive very easy to use, and very fast. As mentioned before, we here at LIST will try to provide a comparative study of 3 or 4 disk drives in the near future. In the mean time check SUM where a review by Joe Williamson should be appearing soon. As far I am concerned, I am very much impressed by the system, and I just can't see how you can get a better price/performance ratio from the other available systems. I sure will miss this system when I have to return it.



Random and Sequential addressing of files is possible. TOS uses the OPEN**1 and CLOSE**1 commands to open and close these files. This was important to mention because, of the five or six disk systems available in England, only the SP-DOS system is capable of random addressing.

The manual also provides an appendix with machine code tips. A small MC program in this section is in error. This program is supposed to copy the 4K shadow ROM into a destination supplied by the user, for disassembly purposes. I think the CALL 0008 should have read JP 0008. But I found an easier way using BASIC. Use the following:

```
SAVE*"TOS.CODE"CODE 0 TO 4195
```

which will ^{store} the 4K of code on the disk. You can load this code to , say, destination starting at 32768 by typing :
LOAD *"CODE 32768,4196

A disassembly reveals that port EFH is being used , which makes this system incompatible with the Microdrives. It should also be of interest to mention that starting from location 0605H to 0626H is a jump table to all the important routines in the shadow ROM. The function and parameters of these routines is ^{explained} in Appendix F of the manual.

The demonstration disk accompanying the system has a BACKUP utility , for copying disks sector by sector. Another utility LOSYS for updating the operating system on each side of the diskette. A DUMP utility is also included, for dumping files to the screen , displaying ASCII and HEX bytes with addresses. The LPRINT utility activates the printer connected to the system's RS232 port , enabling you to use the LLIST and LPRINT commands. The demo disk also has an extensive HELP file documenting all the commands, their syntax and usage. There are some games , as well as some "MATHS" programs (plotting and least squares fitting).

HARDWARE NOTES: This system operates on exactly the ^{same} principle as Sinclair's I/F 1 and Microdrives. When ~~ever~~ you use a new extended BASIC command like LOAD *, this will normally fail the syntax check process causing the computer to do a RST08. When the processor is doing the op code fetch at location 0008H and the address 0008H appears on the address lines, this causes the decoding in the Interface to switch out the Home ROM and switch in the shadow ROM. The shadow ROM checks the syntax of the new commands , and if it is correct it takes the appropriate action , otherwise it throws back the erroneous command at the Home ROM . The shadow ROM is switched out , and Home ROM switched in by jumping to address 0603H (with interrupts enabled) and 0604H with interrupts disabled.

Upon opening the TIMEX Interface unit you discover assorted SSI and MSI chips, a 2732 EPROM , a Synertek 2158 static RAM (1K), a PAL16L8A , and one chip whose identity has been scrubbed off. The 1K RAM is used by the TOS in the address space from 2000H to 23FFH, with locations 2156H to 23FFH free for the user. A very neat idea indeed ! This way TOS does not use any of the 2068 RAM.

THE FINAL TWISTS OF THE TWISTOR

BY N. A. PASHTOON

BACKGROUND: For those of you who may be picking LIST for the first time, the TWISTOR was a bus adaptor for Spectrum peripherals especially the Microdrives, which when used with the TS2068 (equipped with a Spectrum emulator), made the combination work properly. The first article was published in the Dec./Jan. issue of LIST. That design worked with my two computers properly. Later it was discovered that it did not work as intended with all TS2068 computers. In the Feb.85 issue of LIST a modified design, which upon extensive testing did work. The solution in the Feb. issue was an interim solution, which required caps on some timing critical lines as well as a hanging wire from Sinclair's Interface 1 to the Emulator cartridge. In the same issue mention was made of experiments utilizing the ROMCS signal from I/F 1 and other bus signals for switching banks via the BE input to the TS2068. These circuits did switch banks properly, but it did not solve the timing problem we were facing. In the mean time we had feedback from our readers. Recently we were lucky to get two excellent solutions simultaneously from Wes Brzozowski in the SINCUS NEWS as well as letter from John Oliger. John's letter is reproduced on P.15. Since both solutions implement the same logical expression we will call the solution the B/O solution.

MODIFIED TWISTOR DESIGN: Our objective is to prepare a list of recommendations for the manufacture of the TWISTOR in the light of what was said above, as well as taking the TC2068 and TIMEX Disk Drive bus into consideration.

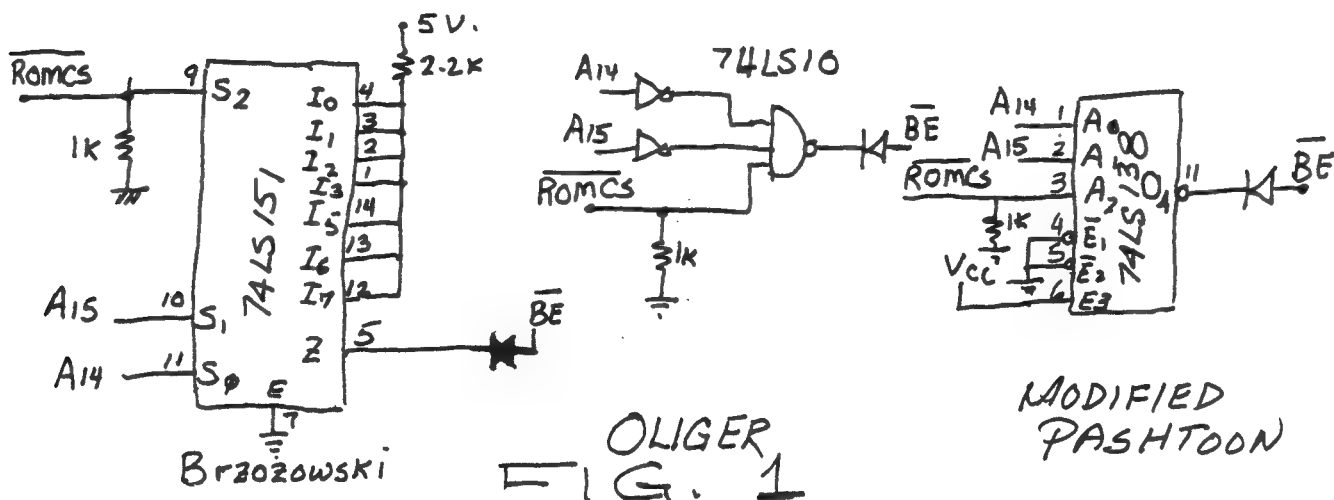
An introductory word to LIST newcomers. The Sinclair I/F 1-Microdrives switches in an 8K ROM, which shadows the lower 8K of HOME ROM, whenever a syntax error is detected. This causes the system to do a RST08. When the op code fetch of the RST08 commences, the address 0008H on the address lines is decoded by the hardware inside the I/F 1, switching off the Home ROM and switching-in the shadow ROM. Exactly the same principle of operation is utilized by the TIMEX Disk Drive Interface. The I/F 1 gives an indication of this on the ROMCS line. The ROMCS line goes active high when the shadow ROM is switched-in. Otherwise it is tri-state and stays in the Hi-Z state.

To utilize the ROMCS from I/F 1, in my Feb. experiments I always conditioned it with MREQ as well as some other signals (see the Feb. issue of LIST). Now if you look at the timing diagram of the Z80 bus, one discovers that MREQ goes low exactly half a T state (180 nS) later than the address lines. Consequently the BE input of the computer was brought active low barely enough in time for some computers, and some others refused to work. Wes and John show clear headed thinking in omitting the MREQ conditioning, thus gaining themselves the 180 nS. While I was concerned with the speed of the EPROM in the emulator and the transmission delay in the decoding, they made that discussion academic, by gaining such a substantial time. So congratulations Wes and John for a very neat solution.

When the B/O solutions arrived I did not have the 74LS10 and the 74LS151 in my junk box. From my Feb. experiments I had a 74LS138 on my TWISTOR. The only modification that I had to make was to get rid of the MREQ conditioning. The circuit works properly and every time. Gone are the capacitors, as well as the hanging wire.

In Fig.1 a schematic of Wes' circuit as well as John's circuit is shown. I also show my modified circuit which I used for making the TIMEX Disk drives work with the TS2068. The logical function these circuits realize is shown in equation form in John's letter on P.15. (Please note that John forgot to complement the expression). Wes' circuit realizes the same logical function. If you look up a data book for LS151, the logical expression for the chip is intimidating. But, if you look at the circuit carefully, all the inputs are asserted high, except I4. The contribution of all these inputs to the logical expression for the chip is zero. This simplifies the expression tremendously.

In words all three circuits generate an active low output when ROMCS is active high (i.e. the shadow ROM needs attention) and when A14, and A15 are low (i.e. when the lower 16K of memory is addressed). The circuits follow:



In Fig.2 (REFERENCE SHEET) we show the TS2068, Spectrum, TC2068, and ZX81 buses. The slots are purposely aligned. My recommendations for the finalized TWISTOR design is to adopt the TC2068 bus, lock - stock- and barrel. Here are the recommendations (Enter Lengua and TEJ Electronics take note):

- 1) Use any of the above circuits or equivalent for feeding back the ROMCS information to the computer via the BE input.
- 2) Use only one regulator (the original TWISTOR had only one) preferably ; a 9 volt regulator. The TC2068 bus has no provision for connection of 12 volts to pins 22T, and 23T.
- 3) Pin 20T of the Spectrum, which is supposed to be -5 volts, is connected to raw DC in the TC2068. In my TWISTOR I didnot follow this part of the recipe. Both the Microdrive and the Disk Drive are working properly.
- 4) Bring out the complete TS2068 bus to the TWISTOR board.
- 5) In line with 4, I would like to urge you to provide for a small prototyping area, where the the one time use video signals can be taken care of. The space provided should accomodate, say, a SYNC stripper circuit like the one recommended by TIMEX.
- 6) Make a provision for a switch that will either connect or disconnect the M1 line from say the microdrives. The line will be pulled high on the Microdrive side of the TWISTOR. This way there is no need to disconnect the TWISTOR when a user likes to use his/her machine in the TS2068 mode.

SPECTRUM-LIKE BUSES

TS2068-LIKE BUSES

TC 2068

REF #

TS 2068

SPECTRUM

TOP	BOTTOM
NC	A ₁₁
A ₁₀	A ₉
A ₈	BUSACK
RFSH	ROMCS
MI	A ₄
+12V.	A ₅
+12V.	A ₆
WAIT	A ₇
-5V.	RESET
WR	BUSRQ
RD	V
IORQ	U
MREQ	Y
HALT	VIDEO
NMI	GND
INT	IORQGE
D ₁₄	A ₃
D ₃	A ₂
D ₅	A ₁
D ₆	A ₀
D ₂	CLK
D ₁	GND
D ₀	GND
SLOT	SLOT
NC	+9V.
D ₇	+5V.
A ₁₃	A ₁₂
A ₁₅	A ₁₄

TOP	BOTTOM
B	GND
G	Conn. to PAL?
R	SYNCH
NC	A ₁₁
A ₁₀	A ₉
A ₈	BUSACK
RFSH	ROMCS
MI	A ₄
NC	A ₅
NC	A ₆
WAIT	A ₇
+9V	RESET
WR	BUSRQ
RD	NC
IORQ	NC
MREQ	NC
HALT	VIDEO
NMI	GND
INT	NC
D ₄	A ₃
D ₃	A ₂
D ₅	A ₁
D ₆	A ₀
D ₂	CLK
D ₁	GND
D ₀	GND
SLOT	SLOT
NC	+9V.
D ₇	+5V
A ₁₃	A ₁₂
A ₁₅	A ₁₄
EXROM	BE

31
30
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21
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19
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17
16
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14
13
12
11
10
9
8
7
6
5
4
3
2
1
0

TOP	BOTTOM
GND	GND
SOUND	VIDEO
IOA5	BUSISO
BE	B
ROSCS	G
EXROM	R
RFSHB	NC
MI	A ₄
RESET	A ₅
BUSRQ	A ₆
WAIT	A ₇
BUSACK	A ₈
WRB	A ₉
RDB	A ₁₀
IORQB	A ₁₁
MREQB	A ₁₂
HALT	A _{13B}
NMI	A _{14B}
INT	A _{15B}
D ₄	A ₃
D ₃	A ₂
D ₅	A ₁
D ₆	A ₀
D ₂	CLK
D ₁	GND
D ₀	GND
SLOT	SLOT
DZIN	NC
D ₇	+5V
A _{7RB}	+15V.
EAR	TAPE out
GND	GND

ZX 81

TOP	BOTTOM
RFSH	ROMCS
MI	A ₄
RESET	A ₅
BUSRQ	A ₆
WAIT	A ₇
BUSACK	A ₈
WR	A ₉
RD	A ₁₀
IORQ	A ₁₁
MREQ	A ₁₂
HALT	A ₁₃
NMI	A ₁₄
INT	A ₁₅
D ₄	A ₃
D ₃	A ₂
D ₅	A ₁
D ₆	A ₀
D ₂	CLK
D ₁	GND
D ₀	GND
SLOT	SLOT
RAMCS	+9V
D ₇	+5V.

So much for the recommendations. I think all of us are interested in knowing about the Microdrive compatibility of the TC2068, and how it is achieved. Fig.3 shows the circuit utilized in the TC2068. I have not tested the circuit in a TS2068. I do want to follow the cardinal rule to the letter "DON'T BREAK ANY TRACES IN THE TS2068!". I can obey this directive since a friend desoldered and socketed every chip in sight (except the SCLD) in one of my TS2068s using industrial desoldering equipment. None of the chips got damaged. Guaranteed that none of the traces is broken either !!! I will report on this experiment in the future.

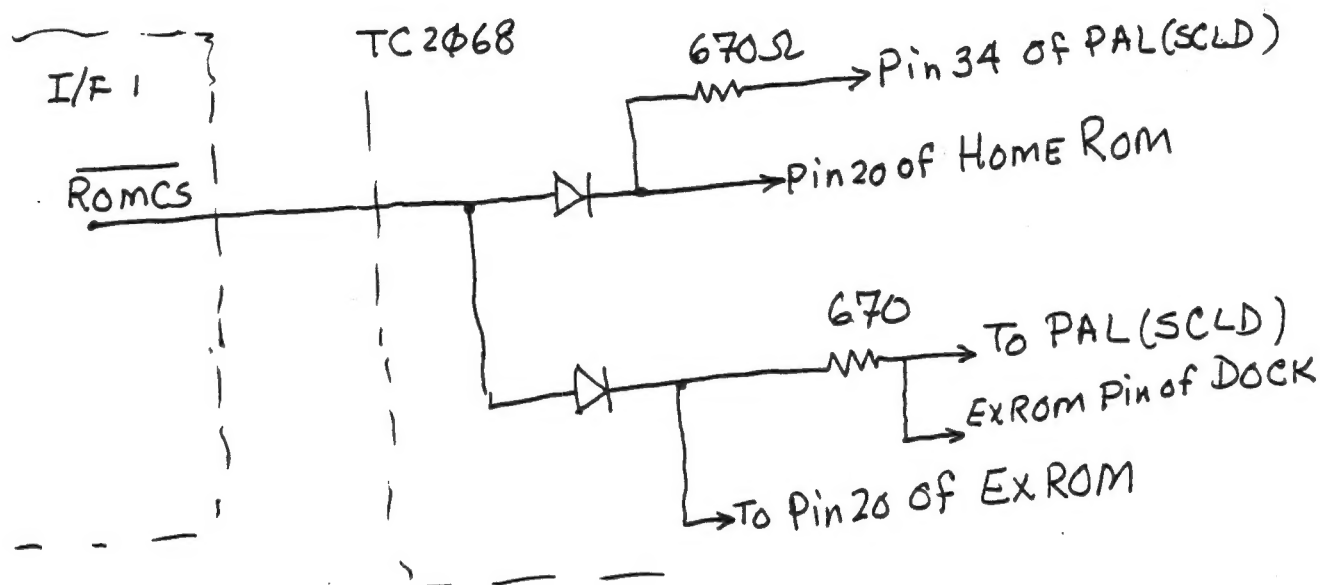


FIG. 3

NOTE: The diodes in Fig1 are necessary. If you monitor the \overline{BE} line in TS2068, when you are inputting a line, a strobe (probably 10 a Sec.) appears. Either the circuit diagram for TS2068 does not show this, or the SCLD designer goofed, by not buffering this input.

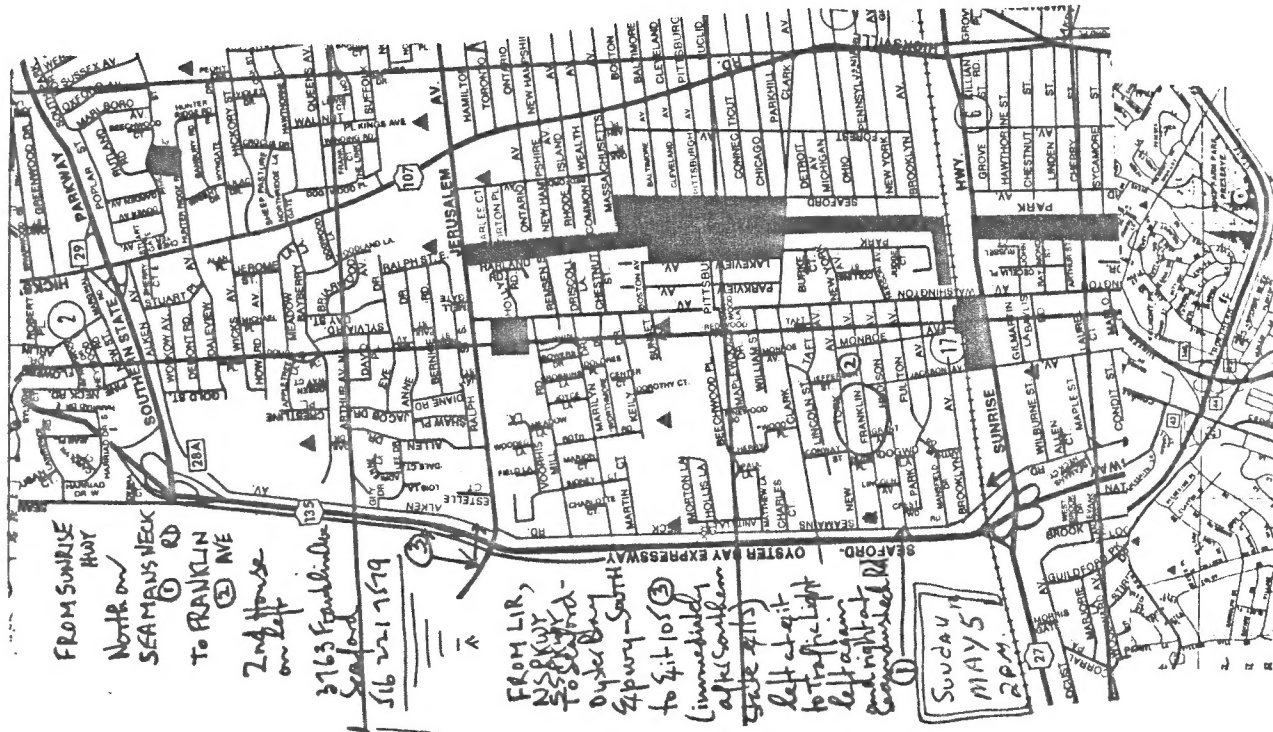
NOTE

We were planning to publish an article on the use of ZX-81 peripherals with the TS2068. For than a month we have the prototypes for the bus adaptor. My apologies to club member who were interested in this project. Next issue we will write the article. We had also to postpone the article on RS232C networking, as well as the TAXAN B210 monitor. Next issue I hope!

NAP Apr. 29, '85

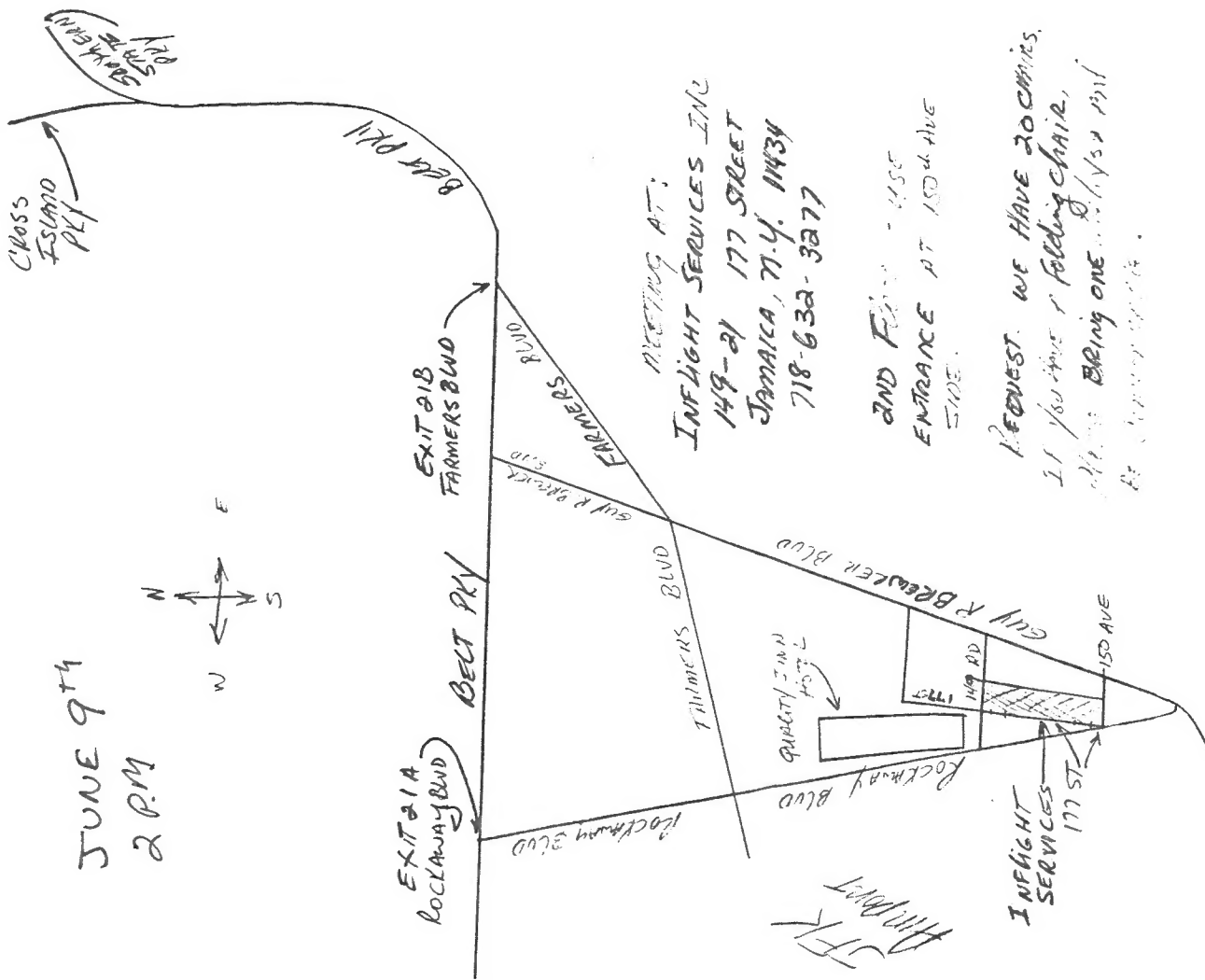
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